For CONTENTS, see page iii and iv of Cover.

pp. 1-60.] [June 30, 1914.

TROPICAL DISEASES BULLETIN

IMPERIAL INSTITUTE
2 JUL. 1914
LIBRARY

Vol. 4. 1914. No. 1.

EXCHANGE COPY

ISSUED UNDER
THE DIRECTION OF THE
HONORARY MANAGING COMMITTEE
OF THE
TROPICAL DISEASES
BUREAU.

General Editor:
THE DIRECTOR OF THE BUREAU.

COMMONWEALTH MYCOLOGICAL INSTITUTE
26 MAY 1971

London:
TROPICAL DISEASES BUREAU,
Imperial Institute, S.W.

Sold by BAILLIÈRE, TINDALL & COX,
8, Henrietta Street, Covent Garden, W.C.

Price 1/6 net.]

[All Rights Reserved.

HONORARY MANAGING COMMITTEE.

Chairman:

The Right Honourable Sir J. West Ridgeway, G.C.B., G.C.M.G., K.C.S.I., LL.D.
(who is also Chairman of the Advisory Committee of the Tropical Diseases Research Fund).

Sir John Rose Bradford, K.C.M.G., F.R.S.
(representing the Royal Society).

Surgeon-General Sir David Bruce, C.B., F.R.S.

Surgeon-General Sir R. Havelock Charles, I.M.S., G.C.V.O.

Colonel Sir William B. Leishman, R.A.M.C., F.R.S., K.H.P.

Sir John M'Fadyean, M.R.C.V.S.

Sir Patrick Manson, G.C.M.G., F.R.S.

Sir Ronald Ross, K.C.B., F.R.S.

Sir S. Stockman, M.R.C.V.S.

Mr. J. A. C. Tilley
(representing the Foreign Office and Sudan Government).

Mr. H. J. Read, C.B., C.M.G.
(representing the Colonial Office),
with
Mr. A. Berriedale Keith, D.C.L., D.Litt.
of the Colonial Office, as Secretary.

STAFF OF THE BUREAU.

Director:

A. G. Bagshawe, M.B., B.C., D.P.H. Cantab.,
of the Uganda Medical Staff.

Assistant Director:

G. C. Low, M.A., M.D., *Lecturer, London School of Tropical Medicine.*

Librarian:

R. L. Sheppard.

Sectional Editors:

Andrew Balfour, C.M.G., M.D., D.P.H. Cantab.

Fleet-Surgeon P. W. Bassett-Smith, R.N., C.B., M.R.C.P.

Major S. Lyle Cummins, R.A.M.C., M.B., B.Ch.

Captain S. R. Douglas, I.M.S. (retd.).

H. B. Fantham, B.A., D.Sc.

Edward Hindle, Ph.D.

Colonel W. G. King, C.I.E., I.M.S. (retd.).

R. T. Leiper, D.Sc., M.B., Ch.B.

J. B. Nias, M.D., M.R.C.P.

F. M. Sandwith, M.D., F.R.C.P.

J. Henderson Smith, M.B., Ch.B.

C. M. Wenyon, M.B., B.S., B.Sc.

Warrington Yorke, M.D.

Editor of the Tropical Veterinary Bulletin:

A. Leslie Sheather, B.Sc., M.R.C.V.S.

Now Ready. Price 7/6 net.

Postage in Great Britain, 4d. Abroad, 6d.

Pp. xvi. × 232, *with* 17 *Plates*
3 *Coloured.*

The Care
AND
Treatment of European Children
IN THE
Tropics.

BY G. MONTAGU HARSTON
M.D.Lond., M.R.C.S.Eng.,
L.R.C.P.Lond.,
Fellow of the Society of Tropical Medicine and Hygiene; Fellow of the Royal Society of Medicine; Examiner in Medicine, Hong Kong University.

With introduction by
Sir PATRICK MANSON, G.C.M.G., M.D.

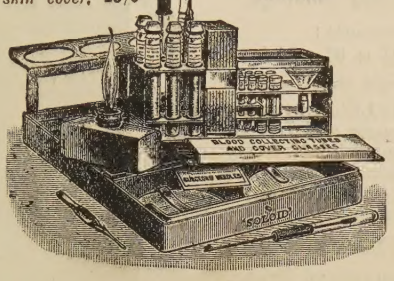
LONDON.
BAILLIÈRE, TINDALL & COX,
8, Henrietta Street, Covent Garden, London.

TRADE MARK 'SOLOID' BRAND
BACTERIOLOGICAL CASE
NO. 505 REGISTERED

Facilitates collection, staining and mounting of blood, pus, sputum, etc., for examination.

Nickel-plated metal with doe-skin cover, 25/0

Obtainable of all Chemists



The advantages of this outfit will be demonstrated, on request, at the Firm's London Exhibition Room:
54, Wigmore Street, W.

BURROUGHS WELLCOME & CO., LONDON
xx 943 COPYRIGHT

NEW TRAVELLING MICROSCOPE.

This new model "Diagnostic" is incomparably superior to the previous model. The whole instrument, including the stage and substage, is more rigid, and the coarse and fine adjustments much stronger, to withstand the rough use to which they are subject on foreign service.

STAND, with Abbe condenser and iris diaphragm, double nosepiece, eyepieces: 2 and 4, objectives: $\frac{2}{3}$", $\frac{1}{6}$", $\frac{1}{12}$" oil immersion, N.A. 1·30; Magnifications from × 55 to 1000 ... ... **£16**

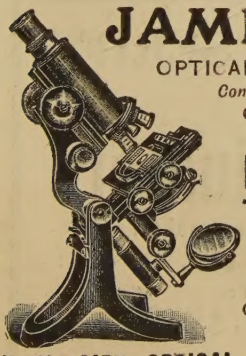
Complete in case measuring 9 × 4½ × 4 in.

Rack and pinion centring substage	£2 0 0
Mechanical stage	3 0 0
Nelson's dark-ground illuminator	1 10 0

C. BAKER, 244 High Holborn, London.

Established 1765.

Agents for Zeiss, Winkel, Leitz, Reichert, etc.
Jung's Microtomes, Grubler's Stains and Reagents.
SECTIONAL PAMPHLETS OR FULL CATALOGUE POST FREE.



JAMES SWIFT & SON,

OPTICAL AND SCIENTIFIC INSTRUMENT MAKERS.

Contractors to all Scientific Departments of H.M. Government.

Grands Prix, Diplomas of Honour, and Gold Medals at London, Paris, Brussels, &c.

New Model "Research" Microscope

THIS is the strongest Microscope on the market and, although not long introduced, is already widely used in Bacteriological Laboratories throughout the Empire. Owing to the special design of the built-in mechanical stage, it is particularly suitable for use with a Dark-ground or other immersion condenser.

rice, fitted with $\frac{2}{3}$-in., $\frac{1}{6}$-in., and $\frac{1}{12}$-in. (Oil Immersion) Objectives, Oculars, Triple Dust-proof Nosepiece, Abbe Condenser, Iris Diaphragm, etc., in Cabinet, **£21.** *CATALOGUE POST FREE.*

UNIVERSITY OPTICAL WORKS, 81, Tottenham Court Road, London, W.

(C40) a

ZEISS TRAVELLING MICROSCOPE.

In Solid Leather Case with Nickel-plated Brass Bindings.

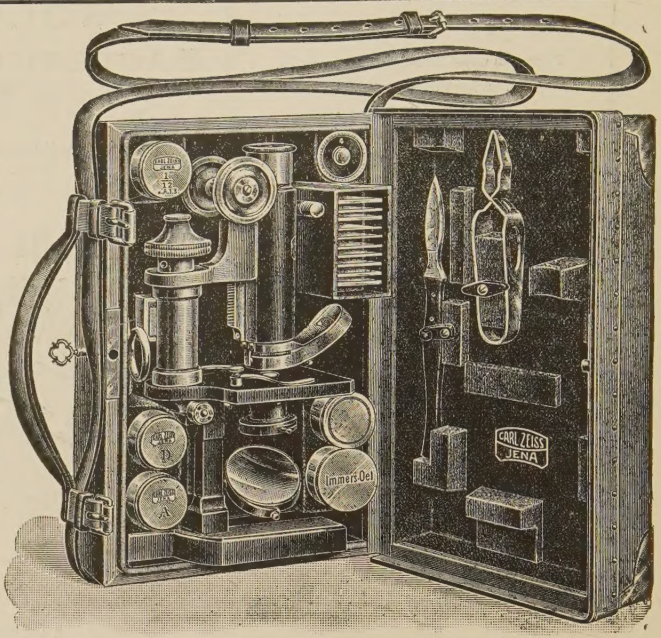
Dimensions :
$10\frac{7}{8} \times 6\frac{3}{8} \times 4$ in.
Weight under 9 lbs.

COMPLETE, with Abbe Condenser and Iris Diaphragm, Triple Nosepiece, 3 Achromats—2/3in., 1/6in., 1/12in. (oil immersion) and 2 Huyghenian Eyepieces,

£17 12 0.

MECHANICAL STAGE, **£4 5 0** extra.

Light. Compact. Economical. Efficient.



Detailed Catalogue "14 M" post free.

CARL ZEISS (London), Ltd., 13-14, GREAT CASTLE STREET, Oxford Circus, London, W.

HORLICK'S MALTED MILK

MALTED BARLEY, WHEAT, and MILK in Powder Form.

THE IDEAL FOOD FOR HOT CLIMATES.

The consistent recommendation of Horlick's Malted Milk by the Medical Profession attests its well balanced composition and uniform excellence. It combines the invaluable food qualities of rich milk and the nutritive extracts of the choicest barley malt and wheat in a form so easily assimilable that it is properly dealt with in the feeblest conditions.
Being thoroughly pasteurised, it may be given freely in septic conditions with the assurance that it will be well tolerated and efficient in maintaining strength, and in every branch of dietetics it is recognised as indispensable. In hot climates it is especially useful as it overcomes the problem of a fresh milk supply.

NO ADDED MILK OR COOKING REQUIRED.

Offered in Sterilized Glass Containers especially adapted for use in the Tropics.

Samples to the Profession free by post on application to

HORLICK'S MALTED MILK CO., Slough, Bucks., England.

THE REICHERT SERIES
OF
HIGH-POWER
Dark Ground Illuminators

is more complete than that of any other maker.

8 Models from £1. 1. 3. to £8. 5. 0.

PAMPHLET post free from DEPOT AGENTS:

H. F. ANGUS & Co., 83, Wigmore Street, LONDON, W.

OR ANY FIRST-CLASS DEALER.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 4.] 1914. [No. 1.

UNDULANT FEVER.

PATERSON (T. F.) & BROWN (H. C.). **Reflections and Proposals resulting from an Enquiry into the Causes of three Epidemics of Malta Fever occurring in the 37th Lancers and the 10th Lancers in India.** —*Proc. Second All-India Sanitary Conference. 1912.* Vol. 3. pp. 300-310. (1913. Simla : Govt. Central Branch Press.)

In this interesting paper a review is given of the prevalence of undulant fever throughout India during the last ten years, with a fairly full description of three recent small epidemics and the research work carried out relating to them. The report is founded on (1) 6 cases occurring among the 37th Lancers at Lahore, (2) 17 cases in the same regiment also at Lahore, with 2 deaths, (3) 24 cases in the 10th Lancers, 15 apparently infected at or near Delhi in December 1911, and 9 at Jullundur. Clinically three types of cases were found, severe and often fatal, moderate or undulant form, and mild, the latter generally producing very marked debility and neuritis. Infection was generally traced to the use of goats' milk ; as horses were thought possibly to act as carriers, 350 were examined but with negative results. One cow belonging to a native officer appears, however, to have been infected. There was strong evidence that this animal played the part of a " carrier." Its serum reacted up to 1 in 400 and the milk whey to 1 in 30, but the micrococcus was not definitely isolated. This was the only animal, other than goats, out of a large number examined that could have supplied infected milk. For detection of " carriers " the serum and milk agglutination tests, with the isolation of the organism from the milk, are recommended, and for prevention the importance of the thorough sterilisation of all milk is strongly insisted upon, with the more general employment of the Ortol test* to prove

* Ortol Test for Milk—Solutions required :—
(1) Ortol ·05 grm.
Distilled water 5 cc.
(2) Hydrogen Peroxide Solution.
Add one drop of the Ortol Solution to a test tube half full of milk, shake and add one drop of Hydrogen Peroxide solution. If *no* pink colour is produced, the milk has already been heated above 75° C.
PATERSON and BROWN state that milk heated to 83° C. became pink, while milk heated to 93° C. kept its colour.

(C40) Wt. P.10/46. 10.3.4. 2,000. 6.14. B.&F. Gp.11/4. A

that this has been done. A table is given showing the incidence of the disease in the Indian army from 1900. Since 1905 there has been a very large increase in the cases; the highest incidence was in 1907, 62 cases and 2 deaths. The fever is widely scattered throughout the Northern and Central parts of India. The number of cases in each place

Map showing Stations at which Undulant Fever occurred in the Indian Army from 1900 to 1911.

in many instances is given, but the prevalence differs very markedly from year to year. Several other tables are annexed showing the results of the agglutination reactions etc. of horses, cows, buffaloes

and goats. In testing the milk for agglutination, whey was employed, and the authors state that it is important to use the minimum amount of rennet, as an excess has a restraining influence on agglutination. They found one volume of Crosse and Blackwell's essence of rennet to 60 volumes of milk gave the best results.

P. W. Bassett-Smith.

Della Vida (M. Levi). **Alcune Osservazioni sopra un Epidemia di Febbre Mediterranea in un Comune della Provincia di Roma.**—*Malaria e Malat. d. Paesi Caldi.* 1914. Mar.-Apr. Vol. 5. No. 2. pp. 105-120. With a plan and 2 figs.

In this paper the author describes again an epidemic of undulant fever in the province of Rome, an account of which was published in the *Annali d'Igiene Sperimentale* (see this *Bulletin*, Vol. 3, p. 212). Here however the etiology, methods of diagnosis, and treatment are more fully discussed, and he emphasises the great value of serum reactions for diagnosis, the spread of infection by other means than ingestion of infected milk, the great value of treatment by means of vaccines of the *M. melitensis*, and the necessity of legislation for stamping out the disease.

P. W. B.-S.

Gatto (Alfredo.). **Sulla Febbre di Malta e sulla Febbre dei Tre Giorni a Scilla (Calabria).**—*Malaria e Malat. d. Paesi Caldi.* 1914. Mar.-Apr. Vol. 5. No. 2. pp. 121-123.

(1) The presence of undulant fever has been frequently noted in Sicily during the last three years. Gabbi demonstrated by bacteriological and clinical methods the existence of the disease in Calabria, and differentiated it from typhoid, paratyphoid, tubercle and influenza. Many cases were described first as pseudo-typhoid. The incubation is said to range from 10 to 16 days, the onset is gradual, insomnia is common, followed by prolonged fever with joint and nerve pains and other symptoms usually found in the disease—but a roseola over chest and abdomen is mentioned which is not commonly seen. The fever generally commences in April and is present throughout the summer and autumn. The author, from his observations, believes that the infection is not always from ingestion of unboiled goats' milk, but may be conveyed by water and blood-sucking insects, such as culex and stomoxys. [No proof of this is given.]

(2) The existence of a short three-day fever, most commonly seen in September, is noted as occurring in epidemic form in Sicily. The symptoms are described in detail, but beyond the fact that in three cases a temporary albuminuria was noticed, they are of no special interest.

P. W. B.-S.

Cantani (A.). **Sulla Flebite nella Febbre di Malta.**—*Policlinico.* Sez pratica. 1914. May 24. Vol. 21. No. 21. pp. 741-743.

The author draws attention to the occurrence of phlebitis during the course of undulant fever. The complication, he states, cannot be very uncommon, as two cases have occurred out of 141 in his own

clinic. The first was a woman aged 60; the thrombosis, affecting the right leg, came on after the fever had passed off. The second was also a woman, aged 39; the diagnosis of typhoid had been made and the thrombosis occurred during the fever, affecting the left leg. The sera when examined gave positive reactions for undulant fever and negative for typhoid and coli infections, the diagnosis being confirmed in both cases by positive cultures from the blood. Blood counts are given of the two cases, which show the usual signs of secondary anaemia and decrease in the relative number of the polymorphonuclear white cells.

[This complication would appear to be more common in women than in men, for the reviewer never had an instance in over 700 men treated at Haslar.]

P. W. B.-S.

Carneiro (M. Gonçalves). **A Febre de Malta no Rio Grande do Sul.**—*Rev. Med. de S. Paulo.* 1914. Feb. 28. Vol. 17. No. 4. pp. 56-64.

This is the first instance of undulant fever reported from Brazil. The author describes one case in detail and states that many similar ones have been observed, several from the same hotel in Cidreira. The symptoms were, prolonged fever of an undulatory character lasting two months, severe sweats, obstinate constipation, neuralgic pains and progressive debility, but there was no mortality. The diagnosis from typhoid and paratyphoid was at first difficult, and was not cleared up until the blood, being tested at the Oswaldo Cruz Institute, gave a definite agglutination with the *M. melitensis* up to 1–200, though blood cultures were negative. Goats' milk is extensively used. At the hotel cows' milk was supplied, but it is stated that goats' milk might possibly be mixed with this.

[An investigation as to whether the goats in the district are infected would be of very great value.]

P. W. B.-S.

Bassett-Smith (P. W.). **Recent Research relating to Undulant or Mediterranean Fever.**—*Trans. Soc. Trop. Med. & Hyg.* 1914. Feb. & Mar. Vol. 7. No. 4. pp. 127-153. With 6 charts.

The work done since the Commission of the Royal Society issued its final report in 1906 is first reviewed. The geographical distribution of the disease has now been much extended. Epidemiologically, the view that an infected milk supply is the chief source of infection is upheld by recent statistics. A diagram is given showing the incidence of undulant fever in the services after the use of infected milk had been stopped. The author points out, however, that other methods of infection are not uncommon, Séjournant stating that in urban areas the infection is generally through ingestion of infected milk, but in rural districts by direct infection or inoculation of infected soil or milk. People with cuts or abrasions on their hands who milk infected animals are liable.

Further work has been accomplished on the pathogenicity of the disease. Eyre and others have shown that besides monkeys and goats, horses, dogs, rabbits, guinea-pigs, rats and mice can be experimentally infected. Though the rabbit gives a serum having a high agglutinating

power, yet a true septicaemia does not appear, as the organism cannot be recovered from the circulating blood. The author used two rabbits and found that their serum reacted up to 1 in 2,000, but this agglutinating reaction was gradually lost, the animals making a complete recovery.

Mention is made of Nègre and Raynaud's discovery of the *M. paramelitensis* [see this *Bulletin*, Vol. 1, p. 75] and the author quotes a case of his own of this infection in the human subject [this *Bulletin*, Vol. 1, p. 579].

Methods of diagnosis, the author believes, must be separately considered for animals and man. The lacto-reaction of Zammit and Horrocks is the most ready and generally used method for detecting infected goats, but this should always be controlled by serum reactions or by other more certain methods.

An important observation mentioned is that in many infected goats there is a localisation of the organism producing a mammitis without general septicaemia. A series of observations for lacto-reactions of cows' milk obtained in London is next given [see below]. As regards diagnosis the following, in the order of their relative value, may be employed—

(1) Sero-culture.
(2) Agglutination.
(3) Complement fixation.
(4) Precipitin test.
(5) Culture of the organism from the urine.

The difficulties of making a clinical diagnosis are constantly being brought forward owing to the irregular character of the symptoms, the long duration of the disease and the presence of certain abortive forms. This has been specially noted in country districts in Spain, Italy and Africa, and cases are frequently mis-diagnosed as typhoid, paratyphoid, and septic and gastro-intestinal infections.

Scordo has obtained very good results by treating artificially infected goats with intravenous injections of perchloride of mercury. Such injections increased the corpuscular elements of the blood, raising the number of red cells and the haemoglobin and also producing a polymorphonuclear leucocytosis with sterilisation of the blood. This method may prove of value in human cases but apparently has not so far been reported. Vaccines may be used with good results, particularly in some acute cases both of *melitensis* and *paramelitensis* infection, and a series of charts showing examples of the rapid disappearance of the fever under vaccine therapy appears at the end of the paper. Clinically a general improvement, as shown by an increased feeling of comfort and a steady gain in weight, is often very marked in such cases, whilst the opsonic index is seen to rise at the same time. The author believes that a polyvalent vaccine made from many strains of the micrococcus might give better results and that the use of sensitised vaccines also requires trial.

Prophylactically, in endemic areas the disease should be made notifiable, local disinfectant methods should be carried out, the importation of infected goats should be stopped and regular examinations of animals by competent persons should be periodically made. Such measures have been taken in France and Algeria with good results. In conclusion the author believes that " we should recognise that though the disease has been practically eradicated from the naval

and military services, where protection of the food can be properly carried out, yet the disease is still rampant in very many endemic areas; also that the source of infection is by no means limited to ingestion of contaminated milk, but is frequently brought about by direct inoculation, particularly in rural districts, and that all cases, ambulant and otherwise, should be looked upon as potential carriers of the disease necessitating the thorough disinfection of excreta and contaminated articles."

The paper is illustrated with a map, a table and a series of charts.

G. C. Low.

CANTANI (Arnaldo). **Ulteriore Contributo sul Valore della Reazione Agglutinante per la Diagnosi della Febbre di Malta.**—*Malaria e Malat. d. Paesi Caldi.* 1914. Mar.-Apr. Vol. 5. No. 2. pp. 65-79.

This is a long and critical review of all the recent work bearing upon the diagnosis of undulant fever by agglutination methods. The contradictory results and the want of specific characters, as demonstrated by various experimenters, are mentioned and are well known. The presence of non-specific agglutinins in normal and abnormal bloods is described, and the value of heating the serum to cut out these. In the author's opinion, which agrees with that of RIMBAUD and others, heating the serum to 57° C. as recommended by NÉGRE and RAYNAUD not only does no good, but is positively harmful, the heated serum being much reduced in sensitiveness, bringing down a reaction of 1–3,000 to 1–200. [This is not found by all other observers.] The character of the organism, the media on which it is grown, the strength of the emulsion, the technique, time limit, and condition of the serum, vary so much in different laboratories that no general statistics can be relied upon—and these differences are the source of the marked irregularities obtained. It is a very definite fact that other organisms, as *B. typhosus*, *B. paratyphosus*, *Streptococcus*, *B. tuberculosis*, etc., may cause the presence of bodies which will agglutinate the *M. melitensis* (generally in low dilutions) and can be usually removed by absorption tests. The author, who has had eight years of both clinical and laboratory experience of fevers in Italy, in an examination of 630 cases found that 119 tubercular infections gave positive reactions with the *M. melitensis*. Out of these 630 he notifies 146 of undulant fever, or 23·17 per cent., the reaction varying from 1–50 to 1–5,000; the greatest number were between 1–200 and 1–500. He takes 1–50 as the minimum dilution that can be used with safety for diagnosis when all possible precautions are taken, though some with 1–25 may possibly be true infections; a dilution of 1–100 giving a positive reaction is more conclusive. He strongly insists upon young 24-hour cultures being used and that the emulsion shall not be too strong, the growth of one tube in 7–8 cc., not in 1 cc. of normal saline as often used; with a maximum time limit of 24 hours for the microscopic test. All reactions must be well controlled, and all sera reacting in low dilutions should also be tested for agglutination with other specific organisms, tuberculin and Wassermann reactions being carried out and leucocyte counts made. It is also important with reactions in low dilutions to repeat the test. The higher the reaction obtained the greater the reliability, but the author does not consider

the agglutination test to be absolutely specific, a blood culture being required to clinch the diagnosis. Many errors are made by calling strange fevers melitensis infections on unreliable data.

[The paper is very full of information and references are given to the authors quoted.]

P. W. B.-S.

Bassett-Smith (P. W.). **The Agglutination of *M. melitensis* by normal Cows' Milk.**—*Lancet.* 1914. Mar. 14. pp. 737-739.

Kennedy noted that the milk from cows in London is in some cases able to cause agglutination of the *M. melitensis.* He obtained a positive reaction with the milk of three out of 22 cows and five times from mixed milks. The reaction was lost by filtering the milk through a Berkefeld or Doulton filter (see this *Bulletin,* Vol. 3, p. 214).

Bassett-Smith believes that there has been some error of technique in getting these results because such cows are certainly not suffering from undulant fever. He therefore tested a number of milks, in some of which he obtained unexpected reactions. He found " that boiling the milk cut out all the reactions ; that heating it to 60° C. for half an hour cut out some, but not all. That with unheated milk of 37 individual cows—tested with equal parts of emulsion made with normal saline solution—3 reacted in half an hour, 6 in one hour, and 6 by sedimentation ; these were reduced to 2, 4, and 5 by heating the milk." In dilution of 1 in 20 of milk direct from the 21 cows he did not get any positive reactions either microscopically in one hour or by sedimentation with heated or unheated samples."

Five samples from cows which had given reactions in low dilutions were plated out for isolation of the *M. melitensis* but without success. He concludes that " there is no doubt that cow's milk in some cases has a natural tendency to agglutinate the *M. melitensis,* but if care is taken most of these non-specific reactions may be avoided. The reaction always requires to be controlled by other methods of diagnosis before an animal can be considered to be infected.

Two tables giving the results of the observations are inserted in the text.

G. C. L.

SPRUE.

Bahr (P. H.). **Researches on Sprue.**—*Trans. Soc. Trop. Med. & Hyg.* 1914. Apr. Vol. 7. No. 4. pp. 161-182. With 8 figs.

This paper is one of the most important contributions to the knowledge of sprue that has appeared of late years.

After touching on the physical and climatic features of Ceylon, where the cases were observed, the author gives the general geographical distribution of sprue, drawing attention to cases that have been reported as originating in Holland and Germany. Passing to the distribution of the disease in Ceylon, he concludes that there is no striking preponderance in any locality. The next point raised is the occurrence of the disease amongst the natives, and the author has collected some eleven cases which include members of all the main native races inhabiting the island. Amongst the Burghers also 8 cases were seen, and 5 out of the 36 cases observed in Europeans were individuals who had been born in and had never left the island. Of the 36 European patients 19 were females and, when it is noted that the proportion of European males to females is as 2 to 1, it must be admitted that the disease is much more common in females than in males.

Passing on to environment and diseases predisposing to sprue, the author could find no evidence to uphold the popular belief that the disease is connected either with the so-called "dry-rot bungalows" or with previous attacks of dysentery.

With regard to the infectivity of the disease the author's conclusions are that its occurrence in persons closely associated with one another was far too frequent to be accidental.

Dealing with the symptoms, the author classifies the disease under two headings, "complete" and "incomplete"; the former including those cases where all the classical symptoms were present, the latter those in which some of the usual symptoms, such as diarrhoea or the typical tongue lesions, were the only manifestations.

Investigating various points which are classed under the heading of clinical pathology, the author states with regard to the colour of the stools that the bile pigments must be altered during their passage through the intestines, as bile of normal colour was always found in the gall bladder post mortem. The reaction of the stools was invariably acid and this acidity was probably due to lactic or butyric, not to hydrochloric acid. Trypsin was absent from the stools. Examination of the urine revealed nothing of importance. The saliva was always acid when tongue lesions were present. Anaemia was not generally a marked feature and as a rule no histological abnormalities were noted in the blood.

With regard to the post mortem findings the first point noted is that the internal organs, liver, spleen, etc. were wasted proportionately to the total body weight. The intestinal mucous membrane was covered from the duodenum downwards with a film of ropy mucus, but no ulceration was observed. The tongue was coated with thrush and the oesophagus with a yellowish substance resembling diphtheric membranes.

On section the stomach was found to be normal; the remainder of the intestinal tract showed chronic inflammatory changes. The membrane covering the oesophagus was composed of yeast-like fungi, and mycelial threads were observed penetrating into the tissues both in the oesophagus and the tongue. In sections of the spleen, certain of the endothelial cells, which were much swollen and degenerated, contained bodies of small size staining pink with Giemsa's stain and retaining Gram's stain, which are in the author's opinion peculiar to sprue and are of a degenerative nature.

Dealing with the etiology of sprue the author, after referring to Castellani's kaleidoscope-like views, discusses the possibility of yeast-like organisms being the cause of the disease and after giving the percentage of positive findings and cultures of such organisms in sprue cases, in cases of other diseases, and in normal individuals, sums up the evidence for and against sprue being a disease due to blastomycotic infection and concludes his paper with a list of the principal points elucidated in his researches, which are given verbatim below :—

"*Evidence in favour of regarding Sprue as a blastomycotic infection.*

"1. Yeast cells and mycelial elements are found intracellularly in scrapings of the tongue lesions at an early stage of the disease, but cannot be found at a later stage in scrapings of the same structure when inflammatory symptoms have subsided.

"2. Yeasts are the only organisms found in the deep layers of the tongue in microscopical sections; the evidence that this infection is not one of recent date received support from the chronic inflammatory changes in the corium of the papillae, and from the presence of Russell's bodies in this situation.

"3. The desquamation of the epithelial cells, accompanied by subacute inflammation of the tongue and of the oesophagus, are changes such as would be expected from a study of the mode of growth of the thrush fungus and of its low order of virulence

"4. A general infection of the intestinal mucus with yeasts was found in sprue post-mortems, but no such a general infection in twenty-six cases of other chronic wasting diarrhoeas.

"5. The stools of sprue, their frothy and gaseous character, are such as one would expect in a blastomycotic infection of the intestinal canal.

"6. The relapsing nature, the chronicity and latency of the disease, are compatible with what is known of the life history of the blastomyces, their periods of attenuated growth and powers of sudden recrudescence.

"7. There is no evidence in favour of regarding the sprue yeast fungus as being otherwise than identical with the thrush fungus (*Monilia albicans*), an organism possessing a very low pathogenic power, but it is possible that under certain conditions, as for instance in the tropics, this power may be greatly augmented. In support of this view I may add that it is a well-recognised fact that there are numerous varieties of yeasts employed in brewing beer and in making wine, and the predominance of one variety in certain districts imparts to local wine its characteristic flavour, which, though differing widely from each other in their powers of growth and fermentation, yet resemble each other minutely in their morphological and cultural characters. May it not be that their pathogenic, as well as their other properties, are capable of being influenced by local conditions?

"8. Wasting and anaemia, both symptoms of sprue, can be produced by continuous intravenous injections of small doses of broth cultures of a pathogenic yeast; moreover a degeneration of the hepatic capillary endothelium, apparently similar to that found in the sprue spleen, may be produced in these animals by the same means.

"9. Diarrhoea, atrophy of the lingual papillae as in sprue, digestive disturbances, and an aphthous ulceration of the mouth are commonly found in infants, the subjects of thrush infections in temperate zones.

" 10. It is possible that obscure diseases of the alimentary canal in children in temperate zones, such as GEE's coeliac diarrhoea, are of the same nature as sprue in adults in the tropics. A hypothesis of this sort would explain the occurrence of sporadic cases of sprue in temperate zones.

" 11. The local affection of different portions of the digestive tract with this fungus would best explain the varying clinical manifestations of sprue.

" 12. To maintain such a hypothesis it is necessary to stipulate for a third factor, a predisposing cause, which may exist in the local tropical climatic conditions, which favour a more precocious and luxuriant growth of all fungi, a matter of common observation to all laboratory workers in the tropics.

Evidence against regarding sprue as a blastomycotic infection.

" 1. The thrush fungus (*Monilia albicans*) is a terminal, though uncommon, infection in other chronic wasting diseases, such as phthisis, cancer, diabetes, etc.

" 2. General infections of the alimentary canal with this fungus have been reported in temperate zones.

" 3. If the geographical distribution of sprue be eventually found to correspond with that of other typical tropical diseases, such a fact alone is in favour of a protozoal, rather than of a fungoid or bacterial, origin of the disease.

CONCLUSIONS.

" Finally, as a result of my work, I submit the following conclusions for consideration :—

" 1. Sprue is a specific disease of tropical and sub-tropical countries, though it is possible that cases occasionally originate in temperate zones.

" 2. It is a disease prevalent in Ceylon, especially amongst the Europeans, but contrary to the opinion hitherto held, it may also occur in the native, irrespective of race or mode of life.

" 3. This fact, together with the occurrence of the disease in people closely associated, suggests a local influence or some communication from man to man.

" 4. Sprue is a variable disease ; it may occur in a mild or in a particularly virulent form, and in common with many other serious diseases, it is sometimes liable to sudden remissions and latent periods.

" 5. There is evidence that the disease may occur as distinct and specific clinical forms according to the portion of the alimentary canal attacked.

" 6. Researches on the composition of the stools point either to a complete absence or inefficiency of the intestinal digestive ferments.

" 7. Researches on the blood and urine are in favour of regarding sprue as an alimentary toxaemia.

" 8. The pathological findings are also in favour of this supposition and point to an infection with the thrush fungus (*Monilia albicans*) as being the organism concerned in its production ; the balance of evidence I have collected I consider is, on the whole, in favour of rather than opposed to this view."

S. R. Douglas.

JUSTI (Karl). **Beiträge zur Kenntnis der Spru (Aphthae tropicae).** [A Contribution to our Knowledge of Sprue.]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Dec. Vol. 17. Beiheft 10. pp. 5–53. [pp. 519–567.] With 1 plate.

In the summer of 1909, when residing in Hong Kong, the author had the opportunity of making a post mortem examination of a case of sprue under particularly favourable circumstances. Immediately after death, injections of a 4 per cent. formalin solution were made into different regions of the abdomen, as recommended by FABER, and

the autopsy was commenced ten minutes afterwards. In this way, in the portions of the alimentary canal to which the solution had gained access, the mucous membrane was sufficiently preserved to permit of detailed microscopic examination. The material so obtained was sent home to Professor Beneke, who communicated the results of his histological examination to the meeting of the German Pathological Congress in 1910 (*Zentralbl. f. allg. Path. u. path. Anat.* Bd. 21. Heft. 10), while the author now provides the clinical history of the case and the remaining notes of the autopsy.

The most interesting part of Professor Beneke's examination of the organs submitted to him was the discovery of rod-like bacteria, both free and enclosed in phagocytes, in the mucous membrane of the tongue, oesophagus, stomach and small and large intestine, and the author regards these bacteria as the true cause of sprue. He considers that the small intestine is the primary seat of the disease in sprue, the epithelium of the villi being invaded by the bacteria in question. The aphthous condition of the mouth and other parts he regards as a supplementary infection, due merely to the progress of the cachexia. For the arguments by which the author supports this thesis reference should be made to the actual paper. The plate gives illustrations of the bacteria discovered.

S. R. D.

Low (George C.). **Arthritis in Sprue.**—*Jl. Trop. Med. & Hyg.* 1914. Jan. 1. Vol. 17. No. 1. pp. 1-2.

The patient, a man aged 43, had resided over 18 years in India. He had had a mild dysenteric diarrhoea once, but not recently. The sprue condition came on insidiously. He was seen in July, 1912, when the stools were of typical sprue character. A strict milk diet was prescribed and the patient improved. In October there was a relapse and in the summer of 1913 another well-marked relapse, since which the condition has not altered much. In May, 1913, slight pains resembling rheumatism began in the right shoulder joint. By November these had increased and the movements of the joint were limited. A surgeon diagnosed adhesions in the shoulder joint due to septic absorption from the intestine. Chloroform was given and the adhesions were broken down. The author writes :—

"It is not perhaps quite correct to term the lesion of the patient's shoulder-joint a pure arthritis, because as far as one can judge the internal arrangements are still in good working order. The changes that have developed would appear to be in the fibrous tissues about and around the joint, namely, in the capsular tissues, and the tendon-sheaths of the different muscles. In these there would seem to have been inflammatory changes of a subacute or chronic nature resulting in the formation of adhesions with a strong tendency to go on increasing and to become progressively worse."

Later, however, slight grating within the joint was noticed, evidently indicating some involvement of the cartilages. The author writes that he has neither seen nor read of a previous case of the kind. He thinks the arthritis must be connected in some way with the sprue, as other possible causes were excluded.

A. G. B.

Schmitter (Ferdinand). **Sprue treated by Emetine Hydrochloride.**—*Military Surgeon.* 1914. Apr. Vol. 34. No. 4. pp. 330-331.

The author, having observed a case of sprue with *E. histolytica* in the stools to show marked improvement when treated with emetine, decided to try the effect of this drug in uncomplicated cases of sprue.

Six cases in all were treated and all showed improvement. A disadvantageous effect of the administration of the drug was a temporary increase in the activity of the intestines, but this the author states was trivial in comparison with the general improvement.

S. R. D.

Werner (H.). **Skorbutsymptome durch einseitige Ernährung mit Haferschleimsuppen bei Sprue.** [Symptoms of Scurvy occurring in a Case of Sprue nourished exclusively on Oatmeal Gruel.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. Apr. Vol. 18. No. 7. p. 252.

The author gives a brief account of a patient, a sea captain aged 57 years, who was treated for sprue, contracted in the tropics, in the Hamburg Seamen's Hospital. The only diet that did not cause intractable diarrhoea was oatmeal gruel. On this the motions became solid, but unfortunately after a week petechiae of a scorbutic character began to appear on the legs. The gruel having been changed for a mixed diet the petechiae disappeared. The patient eventually died of the progress of the disease.

S. R. D.

PLAGUE.

Low (R. Bruce). **Report on the Progress and Diffusion of Plague throughout the World during the two years 1911 and 1912.**—*Forty-Second Ann. Report of the Local Govt. Board, 1912-1913.*—Supplement containing Report of Medical Officer for 1912-1913. Appendix A. No. I. pp. 1–88. 1914. London: Printed under the Authority of H.M. Stationery Office. [Cd. 7181.]

This exceedingly valuable report is itself a summary so condensed that it is impossible to do more here than indicate the nature of its contents. It brings together into one small and convenient pamphlet notices of all the outbreaks of plague recorded during the years 1911–1912, arranging them under the headings of their different countries and where necessary subdividing the countries into provinces and districts. But it is much more than a mere record of figures of cases and mortality, summarising critically also the measures taken to meet the disease and their results in each area, as well as the opinions offered by the local investigators on the origins, transmission, progress, treatment, prophylaxis, etc., of the disease. India naturally occupies a large part of the Report, but not disproportionately, and it is satisfactory to see that, where there is reason to believe in the existence of plague, in spite of the absence of official notification (e.g., the Canary Islands, the Argentine), the fact receives due notice.

J. Henderson Smith.

Browning-Smith (S.). **The Annual Reappearance of Plague.**—*Proc. Second All-India Sanitary Conference, 1912.* Vol. 3. pp. 17–47. With 3 maps. (1913. Simla: Govt. Central Branch Press.)

In a paper published in 1910 Browning-Smith argued from the facts of the plague season in the latter half of 1908 that in the Punjab the annual recurrence of the disease had its origins, not in the few places where plague recognisably lingered on into or through the preceding off-season, i.e., the summer, but developed afresh without reimportation in places where there had been an interval of apparent freedom from the disease in man or rat. In 1911 the increase of plague in the autumn was less than usual and it was possible to make a detailed investigation of all plague appearances between 1st August and 15th December with the object of determining to what extent places in which the infection had demonstrably persisted through the summer either in rats or man were responsible for the recrudescence in the province.

Excluding sporadic cases which did not lead to epidemics and excluding also epidemics demonstrably due to importation from outside the province, the plague outbreaks during the autumn of 1911 can be divided into 2 groups. The first of these comprises the epidemics, 7 in number, which were derived from places where the disease had persisted through the preceding off-season. There were three of these persistent centres, one of them the large town of Rawalpindi where an active epidemic was in progress showing human cases in every week but one from May to 15th December; and from these 3 centres 4 secondary epidemics were started by importation. The second group comprises the epidemics not connected with these centres

and not due to fresh importation, so far as could be ascertained. Of these there were 38 and they gave rise by importation to other 11 secondary epidemics, in all 49. The epidemics of this second group developed after an interval of apparent freedom in places situated in all parts of the province and they arose almost simultaneously in October and November, each infection being slight in itself and apparently unconnected with one another or with the three persistent centres.

It would appear, then, that, so far at least as the Punjab is concerned, the annual recurrence of plague is due much less to those places where it has perceptibly carried over through the off-season than to a fresh reappearance in those places where it had, so far as outward signs showed, died out. This recrudescence is not due to importation, and the most reasonable available explanation of the invisible persistence of the disease is that an epizootic of plague continues below ground, progressing slowly during the off-season, possibly owing to a scarcity of fleas [or of fleas in the most infective state] and quickening up with a return of conditions suitable to flea transmission. The infection of which the autumn development is a continuation may have been marked by a complete epidemic in the preceding season, going on to the exhaustion of the susceptible rat-population, or an incomplete epidemic which the arrival of the hot weather has cut short before rat exhaustion is accomplished. It may have been characterised by rat-mortality only, or there may have been only an imported case without any evidence at the time of infection having occurred locally. There may even have been no evidence of importation, though such has occurred. The factors determining the local reappearance are probably extremely complex. "One is certainly the condition of the rat-population, for plague rarely appears in the autumn in a locality which has suffered a complete epidemic in the beginning of the year."

Importation is no doubt of the utmost importance in the spread of the disease once it has appeared, and complete control of importation would reduce the development enormously. But the really important origin of the annual recurrence is this reappearance without fresh importation, and in the Punjab the primary objective of the plague department has been to attack the origins of the epidemics. For this there has been only one measure available, because in the absence of actual plague it is the only one the people would accept, viz., rat-destruction. And from what has been said it is evident that such a measure must be applied not only to places where the disease has lingered on over the off-season, but far more extensively and systematically, as has been the practice in the Punjab. The paper is accompanied by maps and tables illustrating and supporting the conclusions above summarised and supplying instances of the reappearance of plague after different forms of infection in the preceding season.

J. H. S.

Turkhud (D. A.). **Defective Registration of Plague Deaths, an Explanation for the Reappearance of Plague without Evidence of Importation of Infection.**—*Proc. Second All-India Sanitary Conference, 1912.* Vol. 3. pp. 62-68. (1913. Simla: Govt. Central Branch Press.)

Among the results of a special investigation undertaken in 1908–1910

in the Satara district of Bombay Presidency it transpired clearly that the official plague register is an unreliable index, not only of the number of cases but also of the date of the appearance of the disease in this district. A register of deaths is compiled by the village officers, who are not medically trained, and except in the case of suspected crime no attempt is made to verify the diagnosis or cause of death which is reported to them. At the beginning of an epidemic the disease is frequently unrecognised, but even when recognised the native officer frequently deliberately returns it as "fever," asthma, diarrhoea or some other condition, in order to avoid the trouble which notification of plague brings with it to the village and to the officer himself. Such cases therefore do not appear as plague in the Register of Deaths nor in the special Plague Register, and it is not till the increasing number of cases makes further concealment impossible that notification is made and the registers correctly filled. Turkhud gives various specific instances in which it was discovered on detailed enquiry that unrecorded plague deaths had preceded the first recorded case, and he also gives briefly the results of an investigation where steps were taken to obtain accurate information. This showed that in every case in which a village developed plague, infection could be traced to another village and that no outbreak within the area under examination could be attributed to a recrudescence of the disease without importation. During the off-season each year only one village—and that a different one each year—remained infected, and this village was the source from which all the other villages became infected in each epidemic. If the data had been compiled in the manner of the official registers the early cases would have passed unrecorded, the evidence of importation would have been lost, and the outbreak have appeared as a recrudescence of local latent disease and not as an instance of imported infection.

J. H. S.

Kunhardt (J. C. G.). **The Importance of the Persistence of Plague Infection in certain Villages during the Off-season.**—*Proc. Second All-India Sanitary Conference, 1912.* Vol. 3. pp. 48—61. With 3 charts. (1913. Simla: Govt. Central Branch Press.)

Kunhardt has constructed a table or chart for the years 1899–1904 in which is shown the plague cases returned month by month in certain villages and towns of the Poona district. The plague season in this district lasts from July to the end of March, the off-season occurring in the three remaining months, and the chart includes all villages which have returned plague cases in the first 3 months of the plague season as well as in any of the preceding 6 months. The villages so selected include only a small fraction of all the villages infected in Poona district during the years in question, but they are taken as including all or nearly all the villages which carried plague from one season over the off-season into the next. From this chart it appears that, excluding Poona city and its immediate environment, only 17 villages out of the whole number carried plague over the off-season in these six years, and that unless it does so carry over it is rare for the same village to be infected in two successive seasons. No individual village carried over in more than one year, and there is no reason therefore to look

on plague as endemic in Poona district, except possibly in Poona city. In every case of apparent exception to this rule there are present special circumstances, such as nearness to Poona city, exceptional communications and so on, which render them specially liable to importation of infection from outside. Common to these 17 villages is the fact that in the years they carried over they were all infected late in the preceding plague season. If infection occurs early in a season, the epidemic runs its course and dies out before the arrival of the off-season; but when a village is infected late in the season, the disease is liable to linger through the off-season and reappear next season. Poona city with its suburbs certainly carried over in some seasons, and possibly did so in all. In a large town epidemics take longer to run their course, but it is difficult owing to the extent of the trade-communications to ascertain definitely whether the persistence of the disease may not be due as much to repeated importation as to continuance of the local epidemic. Kunhardt suggests that it is possible to determine beforehand the villages likely to carry over and to take special precautions against its recrudescence in these, which are few enough to permit of thorough treatment. [No data are given which would allow even a rough estimate to be formed of the proportion of the total plague in the district each year which is due to subsequent extension from the villages in which it has carried over the off-season, nor whether plague arising in the fourth or later months of a season is always due to importation—cf. TURKHUD above.]

J. H. S.

TAYLOR (J.). **Plague in the Madras Presidency.**—*Proc. Second All-India Sanitary Conference, 1912.* Vol. 3. pp. 80–87. (1913. Simla: Govt. Central Branch Press.)

This paper summarises briefly the results of a long series of investigations into plague in the Madras Presidency. The Presidency may be divided into five main areas according to physical conditions. The first of these is the long strip between the East Coast on the one hand and on the other the range of hills formed in the North by the Eastern Ghauts and further South by the united Eastern and Western Ghauts. This extensive area lies low, has no well-marked cold weather except in the Northern parts, and it has almost entirely escaped plague. The second area comprises the parts of the central district sloping up to the Mysore plateau which lie above the 1,000 feet level. Here plague is as a rule slight, but there have been several severe, usually isolated, outbreaks in some of the larger municipalities. The cold season is longer than in the first area, especially in Coimbatore. The third area lies between the Eastern and Western Ghauts, and may be subdivided into 2 parts. Of these the more southerly is the Mysore plateau and the adjoining parts of the Presidency above 3,000 feet, with a long period of moderate temperature and no severe hot weather: here plague is practically endemic. The more northerly portion of this third area has an elevation of about 1,500 feet, and includes Bellary district. The annual variation of mean temperature is from 73°–94°, the hot weather being very severe but the cold season lasting three months. Here plague has been inconstant but of exceptional severity, the epidemics in Bellary district accounting in some years for nearly

half the plague deaths in the Presidency. The fourth area is the strip between the Western Ghauts with an equable temperature, neither very hot nor very cold; it has had very little plague except in four seaports, including Mangalore where it has persisted without being severe since 1902. Lastly, the fifth area is the Nilgiri plateau over 6,000 feet, with a climate rather temperate than tropical, and a persistent plague infection not accounting for many deaths in all, but causing a higher percentage mortality in the population than in any district except Bellary.

On the whole there would seem to be a certain correlation between the climatic conditions and the incidence of plague in the Presidency. But plague is responsible for relatively few deaths in Madras. Outside Bellary district and the small elevated area next the Mysore plateau it has reached noteworthy epidemic proportions in only a few large towns, and apart from these would be of less importance as a cause of mortality than simple diseases such as bronchitis. The exceptional severity of the disease in Bellary cannot be explained by the nature of its climate alone. Adjoining districts with much the same climate do not suffer to nearly the same degree, and Taylor suggests that its proximity to infected parts of Bombay Presidency may be responsible for its liability to infection.

Observations were also made on the flea prevalence in different parts of the Presidency throughout an entire year. It appears from these that the longest period of high flea prevalence occurs in the highest and coolest places, in the area where plague is endemic, and the lowest flea count was made in the low-lying hotter areas which have escaped plague, and intermediate counts were obtained in places occupying an intermediate position with regard to elevation, temperature and plague.

J. H. S.

White (F. Norman). **Grain and the Grain Trade considered as Factors in the Persistence and Dissemination of Plague in India.**—*Proc. Second All-India Sanitary Conference, 1912.* Vol. 3. pp. 72-79. (1913. Silma: Govt. Central Branch Press.)

The importation of plague has been repeatedly ascribed to the importation of grain, and White points out two or three recent instances where the grain was supposed to be responsible for its introduction to a fresh district. He is himself of opinion that the carriage of infected rats or fleas in grain is of an importance second to none in spreading the disease, and finds some confirmation of this view in certain broad facts in the history of epidemics in the United Provinces and India generally. The United Provinces were first infected from the Bengal district of Saran, the disease appearing in January 1901 in Raniganj in the Ballia district, in a house adjoining the shop of a grain dealer, and its rapid spread from Raniganj through the province was attributed at the time to the fact that this town was a large grain mart supplying numerous villages. Plague reappeared in 1901–1902, almost entirely confined to the Benares division and Allahabad district. The infection came most probably from Bengal, and trade returns show that of the grain imported into the United Provinces from Bengal over nine-tenths went to the Benares division and a large part of the remainder

to the Allahabad district. Again, if the trade blocks in the West of the United Provinces be arranged on the one hand in the order of size of their grain imports (reckoned per head of population) and on the other in the order of their plague death-rate, it is found that the order in the two lists is the same. Banda Town, again, has had a remarkable immunity from plague, and it imports practically no grain. Jhansi, again, imports its grain chiefly from Bhopal and Gwalior, and the years in which it suffered from epidemic plague were also years of epidemic plague in Bhopal. Against this view is the well-known fact that plague is usually less severe in years of famine and scarcity, although these are years of increased grain-importation, but this might be due to a reduced rat-population in years of scarcity.

It is reasonable to suppose that plague should have some association with grain, whether largely transmitted in it or not. Grain stores are favourite resorts of rats, e.g. White found in Belgaum during the epidemic that rats were more plentiful in grain go-downs and the Market than elsewhere (he also found a higher percentage of infection in the rats caught there than in those caught elsewhere) and the epizootic once started amongst them would have greater chances of spreading and persisting. The method of storage is therefore of importance, and a brief summary is given of the results of an enquiry into the methods in use in the United Provinces, from which it would appear that there is a marked freedom from rats when the grain is stored in pits (possibly owing to the heat generated inside the pits).

J. H. S.

Castellani (Aldo) & Philip (Marshall). **Plague in Ceylon.**—*Brit. Med. Jl.* 1914. Apr. 4. pp. 752-753.

No indigenous cases of plague have hitherto been known to occur in Ceylon, but in January of this year it appeared for the first time and had caused 48 cases at the time of writing this paper. The disease has been of an extremely virulent form, death occurring usually within 48 hours, and has taken a septicaemic type without enlargement of lymphatic glands and without pneumonia, the clinical symptoms being merely high fever and headache (meningeal congestion was very marked in 2 of the 3 cases of which details are given). The organisms isolated post mortem were typical *B. pestis*, very virulent to monkeys, rats, mice, guinea-pigs and rabbits, and have given rise to a general septicaemia, even on subcutaneous inoculation, without formation of buboes. No unusual mortality was observed amongst rats before the recognition of the disease in man, and some infected rats have been since found, but this is hardly sufficient evidence for the suggestion that the epidemic preceded the epizootic.

J. H. S.

Fargier. **Epidémie de Peste au Cap Saint-Jacques [Cochin China]. (Septembre à Décembre 1911).**—*Ann. d'Hyg. et Méd. Coloniales.* 1913. Oct.-Nov.-Dec. Vol. 16. No. 4. pp. 931-935.

This epidemic, which began as isolated cases in different parts of the town, localised itself mainly in the old market and its neighbourhood, and enquiry showed that for some time previously dead rats had been found daily in the houses and streets of the market. Only 19 cases

were officially recognised with 17 deaths, most of them showing distinct buboes. A small number were septicaemic in type, and they were all in individuals one or more of whose family had already died of the disease. Energetic compulsory vaccination with Haffkine was carried out with apparently excellent effects.

J. H. S.

Arnould. **Epidémie de Peste de Phu-Luu (Province de Bac-Ninh), pendant le 1er Trimestre de 1913.**—*Ann. d'Hyg. et Méd. Coloniales.* 1913. Oct.-Nov.-Dec. Vol. 16. No. 4. pp. 937-945.

A brief notice of an epidemic of about 60 cases, presumably imported from China, with recommendations as to the administrative measures desirable in dealing with the natives of the district.

J. H. S.

Doucet. **Epidémie de Peste en Nouvelle-Calédonie en 1912.**—*Ann. d'Hyg. et Méd. Coloniales.* 1913. Oct.-Nov.-Dec. Vol. 16. No. 4. pp. 891-901.

Leboeuf. **Epidémie de Peste en Nouvelle-Calédonie en 1912. Travaux de Laboratoire.**—*Ibid.* pp. 901-910.

Collin. **Epidémie de Peste en Nouvelle-Calédonie en 1912. Epidémiologie et Prophylaxie.**—*Ibid.* pp. 910-927.

Béros & Bocquillon. **Epidémie de Peste de Nérin et de Gondé (Nouvelle-Calédonie, 1912-1913).**—*Ibid.* pp. 927-931.

On the 30th August, 1912, a steamer arrived at Noumea and disembarked passengers and goods at the quay. On the 2nd September 3 rats were found on board dead of plague, and at the beginning of September (Collin says at the end of August) news was received that an unusual mortality had occurred amongst the rats in the north-east of the island, from which quarter the steamer had taken on goods. The ship was disinfected, but 15 days later, on September 17th, the first human case occurred, followed by three more in September, all fatal. No cases occurred from 28th September to 9th October, then a series of fresh attacks began, and the epidemic reached its height in the second week of November to die out by the end of December. In all there were 62 cases, of whom 34 were European with 14 deaths, and 28 natives with 26 deaths, and practically all the early cases were connected in some way with the docks.

At first the disease was very virulent, and buboes only appeared towards the end of an attack, but later crural buboes developed at the beginning of the fever, usually suppurating towards the 7th day. In the later stages of the epidemic serum in large doses proved very useful, but it was ineffective at first. So far as the numbers allow one to form an impression vaccination with Haffkine proved an efficient prophylactic. One case developed numerous cutaneous blebs filled with seropurulent fluid which contained many plague bacilli, a possible source of direct contamination.

There were grounds for stating that the appearance of the disease in the rats of a quarter of the town preceded the development of human cases, if any, by 10–15 days. Owing to the reluctance of the natives,

however, to notify the finding of dead rats and to send in their corpses for examination, it was not possible to follow the progress of the epizootic very satisfactorily.

An account is given by Collin of the general course of the epidemic, the measures adopted to control the outbreak, and the proposals for preventing similar outbreaks in the future, the most important of which is systematic rat-examination and destruction at the beginning of summer, the season of the year when three out of the four recent epidemics of plague in Noumea have started.

At the time when the epidemic at Noumea was dying down, a small outbreak of 11 cases with 9 deaths occurred in the interior of the island, involving the tribes at Nérin and Gondé. The source of this outbreak is obscure as there appeared no likelihood of importation of the disease in these remote villages. Beros and Bocquillon suggest that it was derived from a village 25 kilos. away, where in 1900–1901 plague had been severe, though there is no evidence of the survival of the disease there. As an example of apparently long persistence of plague in a village in one spot, they give the following instance. In 1901 a native contracted plague in a village where an epidemic was in progress, and returning to a house in Pouebo died there. Six years later a native woman developed plague in the same house at Pouebo and was the first case in an epidemic of 38 cases.

J. H. S.

Collin (Léon). **Petite Epidémie de Peste en Nouvelle-Calédonie. Considérations étiologiques et diagnostiques.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 660-663.

The present outbreak occurred in 1913 in a tribe which had hitherto been free and the source of the infection is obscure. The tribal area lies some 20 kilos. from the villages of Gondé and Nérin, where 11 cases of bubonic plague had occurred in the preceding December, but owing to geographical situation intercommunication is slight and there was no evidence of infection from that source. The cases themselves were curious. Five occurred in August almost simultaneously, with one death, but only one showed a bubo, and the symptoms were those rather of a severe gastro-intestinal intoxication. Four of these were convalescent, when one relapsed after 10 days and died in 30 hours with enormous enlargement of submaxillary and parotid glands. Isolation measures were adopted but 15 days later another case, and a week after that a seventh, occurred, both fatal but only the latter showing a bubo. From the sixth case *B. pestis* was isolated and the writer has no doubt that all were cases of plague. They are remarkable for the absence of buboes without pneumonic involvement in four of the cases and for the exclusively cervical situation of the buboes in the other three, and for the fatal relapse in one case after recovery seemed established.

J. H. S.

Grubbs (S. B.). **The Plague Outbreak in Porto Rico.**—*Jl. Amer. Med. Assoc.* 1914. Jan. 24. Vol. 62. No. 4. pp. 288-289.

In June 1912 bubonic plague appeared in a district of San Juan,

Porto Rico, and during a sharp outbreak lasting 92 days caused 56 cases with 36 deaths. The infection is believed (though there were other sources possible) to have been imported from Santa Cruz de Teneriffe in the Canary Islands. Sixty-nine cases of plague occurred there in 1906–1907, but the fact was suppressed, and there may have been later cases both in men and rats. The disease occurred in Porto Rico in June, in Havana on July 4th, in New Orleans on July 27th, and in Liverpool on August 1st and 30th, 1912, all these ports being on the route of a line of Spanish steamers which call at Santa Cruz after leaving Spain. Whether the outbreak in Porto Rico was derived from the Canary Islands or not, the concealment of the epidemic in the latter place, which was done deliberately and not from ignorance, is a very regrettable occurrence, complicating gravely and unnecessarily the already sufficiently difficult problems of international sanitation.

J. H. S.

Ilvento (Arcangelo) & Mazzitelli (Michele). **Esistenza del Bacillo pestoso nell'Organismo senza Sintomi clinici.** [Existence of *B. pestis* in the Organism without Clinical Symptoms.]—*Riforma Medica.* 1914. Mar. 28. Vol. 30. No. 13. pp. 348-349.

An account of the case of a man who was found to be carrying the *B. pestis* without clinical symptoms. He had been brought under observation as a contact with a case of bubonic plague, and after five days, during which the only suspicious circumstance was a bilateral enlargement of the inguinal and axillary glands to the size of a bean, was sent home again. A week later he came back to hospital with a slight rise of temperature and some malaise following on a debauch, which was enough to account for these symptoms. However, one of the crural glands was punctured and yielded a culture of *B. pestis* (no animal tests). The organism was not found elsewhere, and 15 days later, the general symptoms having returned to normal but the glands remaining enlarged, a second puncture was made with negative result. Observation was continued for a month without any other sign of the infection developing.

J. H. S.

Row (R.). **Curative Value of a "Glycerinated Pest Vaccine" in Plague.** —*Trans. xvii Intern. Congress of Med.* London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2. pp. 49-51.

Vaccine Treatment in Bubonic Plague. [Memoranda.]—*Brit. Med. Jl.* 1913. Oct. 18. p. 1021.

The vaccine in question is derived from young first subcultures or the actual first cultures on agar of the peripheral blood of human cases of septicaemic plague. Such cultures give a uniform emulsion allowing accurate dosage, owing to the fact that the organisms are enclosed, as it were, in a capsule of a "glutinous globulin-like protein" easily soluble in dilute NaCl solution and on that account readily absorbed from the subcutaneous tissues. The bacilli are killed with the help of glycerine without heat or other antiseptic, and are stocked in the strength of 1 agar slope to 1 cc. of 50 per cent. glycerine in normal

saline. For use this emulsion is diluted to the strength of 1 agar slope to 25 cc. of the glycerinated saline, and ¼ cc. is injected subcutaneously. This represents about 85–90 million bacilli. This vaccine is claimed to have had a distinctly curative action in cases of plague not actually septicaemic. At the time of injection an agar-culture is made from the patient's finger, and the writer has never seen a case of plague recover in which the bacillus was isolated in this way. In 89 consecutive cases treated with the vaccine 47 gave such positive cultures, i.e. were septicaemic, and all died, while of 42 apparently not septicaemic only 7 died, the others (83·6 per cent.) recovering. During the first 6–12 hours after the injection there was a distinct increase of temperature and exaggeration of symptoms, i.e., a definite reaction in all cases which resulted favourably, the others showing no reaction, and 12–24 hours after injection, especially if given in the first three days of the disease, a general amelioration sets in, the buboes usually subside, and there is a rapid recovery.

J. H. S.

Stevenson (W. D. H.). **The Absence of a "Negative Phase" after Inoculation with Plague Prophylactic.**—*Proc. Second All-India Sanitary Conference, 1912.* Vol. 3. pp. 94-99. (1913. Simla: Govt. Central Branch Press.)

280 rats (*M. rattus*) in 8 groups of 35 each were inoculated with a standard dose of vaccine at varying intervals before they received a standard dose of spleen emulsion containing ·0019 mgm. of spleen from a rat dead of plague. One group received no vaccine and served as control. Of this control 88 per cent. died of plague.

Of those vaccinated	1 day	previously	62.8	per cent.	died of plague.
,,	3 days	,,	39·7	,,	,,
,,	5	,,	54·5	,,	,,
,,	7	,,	62	,,	,,
,,	9	,,	64·7	,,	,,
,,	10	,,	63·6	,,	,,
,,	14	,,	56·2	,,	,,

In a second experiment 7 groups of rats, each group containing 40 rats, were inoculated with a similar emulsion containing ·0009 mgm. of spleen-tissue, with the following result :—

Of the controls with no previous vaccination 85 per cent. died.

Of those vaccinated	1½	hours previously	82·5	per cent.	died of plague.
,,	5	,,	77·5	,,	,,
,,	8½	,,	65	,,	,,
,,	22	,,	64·1	,,	,,
,,	46	,,	50	,,	,,
,,	3 days	,,	71·7	,,	,,

There is therefore no appearance of a negative phase in rats, the protection developing in a few hours, rising till the second or third day, and after a slight decline remaining more or less steady up to the 10th to 14th day. The rats used were susceptible Madras rats.

J. H. S.

Schöbl (Otto). **Bacteriological Observations made during the Outbreak of Plague in Manila in 1912.**—*Philippine Jl. of Science.* Sect. B. Trop. Med. 1913. Dec. Vol. 8. No. 6. pp. 409-426. With 1 plate.

Schöbl looks on blood culture as a very valuable diagnostic method in the febrile stage of the disease, and succeeded in isolating the *B. pestis* by this means in 14 out of 15 cases tried, even in the absence of a bubo and before signs of pulmonary involvement. Puncture of the bubo frequently failed to show the organism. In the early stages repeated puncture usually gave it, but later on, especially in cases which recover, it disappears from the gland, apparently taken up by phagocytes. The bacillus was also found in large numbers in skin lesions, and a case occurred in which the patient was discharging large numbers of bacilli in his sputum while still able for work.

An account is given of an epidemic in laboratory animals which was spread by fleas, and a case is recorded of a natural infection in a cat, where the bacillus was clearly identified by culture and animal experiments. *B. pestis* was not found in bed-bugs from the beds of infected patients, nor in dog fleas in infected houses. A brief notice is given of the findings in the many thousand rats examined for plague.

J. H. S.

Kato (S.). **An Investigation on the Transmission of Plague by Fleas.** [In Japanese.]—[*Jl. of Bacteriology.* Japan. 1913. Dec. No. 218.]

The author made several investigations in order to ascertain whether fleas transmit the germ of plague by means of the faeces or by bite, and whether transmission is biological or mechanical. He injected the plague bacilli into experimental animals repeatedly, strengthening the virulence, and then injected them into mice, rats and guinea-pigs and fed fleas upon these (fixing the fleas with a silver wire). In one third of the fleas the germs were found in the stomachs (most of them on the third day), and were recognised there for nine days after they sucked the blood. The germs remained in the faeces of the fleas without losing virulence. The author rubbed the germ-containing faeces over the shaved skin of the abdominal walls of the experimental animals. Five of 26 guinea-pigs thus treated died after seven days, with gangrenous ulceration of the rubbed part of the belly and severe inflammation of the inguinal glands of the same side, but the rats and mice which were treated by the same method had no symptoms. The author fed also infected fleas upon healthy animals. One mouse out of ten and three guinea-pigs out of 26 died, but no local change could be recognised. He rubbed, next, ground fleas (infected) over the shaved skin of the abdominal walls of the guinea-pigs; twelve out of 42 were infected. On the other hand, he fed uninfected fleas upon the shaved abdominal walls of the guinea-pigs and rubbed the faeces of the plague infected fleas as well as the cultivated plague bacillus over the bitten wounds, with negative results in all 20 experiments. He placed an infected guinea-pig and a healthy one in a box, separated by a septum so as they could not communicate with each other, and put many fleas into the box. In this experiment he found that the healthy animals were infected every time.

From the above experiments the author concludes that bubonic plague is caused by means of the bite of the flea and it is very probable that the disease is transmitted by the flea not only mechanically but that also the ingested germs come to the biting apparatus from the stomach of the flea. [See on this subject BACOT and MARTIN, this *Bulletin*, Vol. 3, p. 201].

M. Kumagawa.

LISTON (W. Glen). **Plague Preventive Measures.**—*Proc. Second All-India Sanitary Conference, 1912.* Vol. 3. pp. 100-105. (1913. Simla : Govt. Central Branch Press.)

Measures for the prevention of plague in man must be designed to prevent the spread of the disease in rats. But whereas in the similar cases of glanders, hydrophobia or anthrax authorities can enforce the destruction of valuable animals, they have no powers to enforce the destruction or exclusion of rats, even in the case of premises where they are known to swarm and are a serious menace to public health. The conditions which encourage rats are chiefly an ample food supply, shelter for breeding and the absence of enemies, and it is in modification of these conditions that a permanent plague policy must find its basis. In the ordinary house, and even in places where much has been done to provide an efficient sanitary and drainage system, there is usually plenty of food for rats, and this is largely due to inefficient scavenging. A good system of removing waste would reduce very materially the opportunities offered to the rat, but it is rare to find scavenging adequately and systematically carried out. Of course there will long remain the harbourage afforded by grain-stores, but in Bombay the storing of grain in larger quantities than is necessary for retail sale is already prohibited in shops which form part of inhabited dwellings, and it might easily be made compulsory to store the grain in rat-proof receptacles when the shop is closed and not in the open basket which is so common. Rat-proof market-places are not impossible, and it is hoped to make trial of one at Belgaum shortly. The rat is nocturnal in habit and prefers dark places. Well-lit and well ventilated rooms they dislike, and attention to the construction of dwelling houses is therefore of the greatest importance. Yet little is done in this direction. It should be possible to insist on the $63\frac{1}{2}^{\circ}$ standard of lighting and ventilation, allowing a period of years within which the necessary alterations must be made, but closing definitely and at once all the very bad quarters which are really unfit for habitation. If the people could be educated to appreciate that the rat is an enemy, they would cooperate in this, and a systematised organisation of instruction would repay the cost. With even only a small outlay much might be done at present by utilising existing organisations, and teaching by lecture and demonstration could be arranged in many places where little or nothing of the kind is being done.

J. H. S.

ROSS (W. C.). **The Prevention of Plague.**—*Proc. Second All-India Sanitary Conference, 1912.* Vol. 3. pp. 90—92. (1913. Simla: Govt. Central Branch Press.)

Ross points out that the use of pulicidal or combined disinfectants

in infected houses has only a temporary and possibly misleading protective effect. Rat-destruction also can only be a temporary measure in practice. and the use of vaccines, while they might be made much more efficient by graduated and repeated dosage, confers only an individual immunity without reducing the sources of infection. The proper method in India, he says, of breaking the chain between the rat and man is to alter the relation in which the rat lives with regard to man.

J. H. S.

De Raadt (O. L. E.). **Pestbestrijding te Shanghai en Pestbestrijding op Java.** [Plague Measures in Shanghai and Java.]—*Geneeskund. Tijdschr. v. Nederl.-Indië.* 1914. Vol. 54. No. 1. pp. 66-72.

De Raadt defends the plague measures adopted in Java from the criticisms made by van Driel (this *Bulletin*, Vol. 3, p. 207) that they lost in practical efficiency by their attention to so-called academic and theoretic questions. He points out that it is only on the basis of epidemiological and biological studies of the disease in rats and fleas as well as man that preventive measures can be properly directed, and that such academic study may be of direct financial importance, e.g., it is useless to pay for the corpses of field-rats if they do not carry plague. He maintains that the efficiency of the plague measures taken in Java, based like the Shanghai measures on the maxim that a rat-free house is a plague-free house, proved to be no less great than the elaborate procedure at Shanghai adopted by van Driel, which de Raadt criticises in his turn.

J. H. S.

Browning-Smith (S.). **A Simple Method of Rat Destruction.**—*Proc. Second All-India Sanitary Conference, 1912.* Vol. 3. pp. 70-71. (1913. Simla: Govt. Central Branch Press.)

A cheap and simple method of driving the fumes of burning sulphur into rat-holes, which has given excellent results in the limited experience as yet obtained. J. H. S.

Swellengrebel (N. H.). **Een Tweede Geval van Ratpest op een Schip in de Haven van Amsterdam.** [A Second Case of Rat Plague on a Ship in Amsterdam Harbour.]—*Nederl. Tijdschr. v. Geneeskunde.* 1914. Feb. 7. I. Helft. No. 6. pp. 393-396.

The writer received from a steamship from Montevideo the corpse of a rat which had been taken alive and killed on board. On examination the glands were a little swollen and haemorrhagic, the spleen was enlarged, but there was no subcutaneous haemorrhages nor pleural exudate. From his experience in Java he suspected that this rat might be suffering from subacute plague. Inoculation of material from the glands and spleen subcutaneously into a guinea-pig killed it in two days with greatly enlarged glands and subcutaneous haemorrhagic oedema but no enlargement of spleen, and plague bacilli could not be seen in glands or spleen. Another pig inoculated from the glands of the first died with typical signs of plague, the bacilli were present in large numbers in all organs, and typical cultures were obtained from the spleen, virulent for rats and guinea-pigs.

No dead rats were found on the ship and no other infected rat was met with. The writer believes that this animal was infected when it came on board but owing to the scarcity of bacilli in its peripheral blood had caused no infection in other rats. Plague of this type can run a course of 1½ months in one animal, according to the writer, and the voyage lasted only 29 days. Such animals may be a source of danger, for the disease may pass into the acute type or the animal may be eaten by other rats and infect them by way of the intestinal tract. (In a note it is added that two cases of plague in *M. decumanus* have recently been met with in Amsterdam.) J. H. S.

Swellengrebel (N. H.) & Otten (L.). **Ueber "mitigierte" Pestinfektion bei Ratten und Meerschweinchen.** ["Subacute" Plague in Rats and Guinea-pigs.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. March. Vol. 18. No. 5. pp. 149-159.

This is characterised by the protracted course, a month or more, of the disease before death occurs, and by the pathological picture. There is no enlargement of the spleen, scarcely any subcutaneous oedema, no evidence of encapsulated areas, adhesions or resolution, but multiple small axillary or inguinal buboes, perhaps exudate in the serous cavities, and notably haemorrhages in all organs. Plague bacilli cannot be seen in glands, spleen, lungs or exudate, and inoculation into a second animal may produce only a similarly chronic disease. The condition is shown to be pest, since inoculation from the second into a third animal usually produces acute typical plague. This may occur with the first transference, or may be delayed until a fourth passage, but eventually one or other passage produces the acute disease.

The writers, who believe this condition to be different from chronic or resolving plague and one not previously described, met with it in a plague rat, and in guinea-pigs inoculated with the rectal contents of infected fleas (*X. cheopis*), and produced it in other conditions where the inoculated material was supposed to be of low virulence. They were able to produce it also by cutaneous, though not by subcutaneous, inoculation of very small doses of fully virulent bacilli. They consider that it may be of importance in spreading the disease from one place to another, since the infected animal remains well for weeks, and, although the number of organisms is too small to infect fleas so long as the disease remains subacute, there is a possibility of its passing over into the acute form. The possible failure of inoculation from a suspected animal to produce acute plague, and the fact that an apparently healthy rat may really be infected make still more difficult the diagnosis, e.g. in the case of ship-rats. J. H. S.

Markl. **Kasuistischer Beitrag zur Rattenpest.**—*Centralbl. f. Bakt.* I. Abt., Orig. 1914. Feb. 25. Vol. 73. No. 2. pp. 135-136.

Markl notes that while it is usual, owing to the overgrowth by other organisms, to experience difficulty in isolating *B. pestis* in direct culture from rats found dead, this may sometimes be achieved from the heart contents, and gives details of a case in which this was successful when animal inoculation, other than by rubbing into the skin, failed.

J. H. S.

De Beaufort (L. F.). **Bericht über eine Untersuchung einiger in 1911 von Dr. J. J. Van Loghem auf Java gesammelten Ratten.** [Report on an Examination of some Rats collected in 1911 in Java by Dr. Van Loghem.]—*Mededeelingen v. d. Burgerlijken Geneeskund. Dienst in Nederl-Indië.* 1913. Vol. 2. No. 2. pp. 5-14.

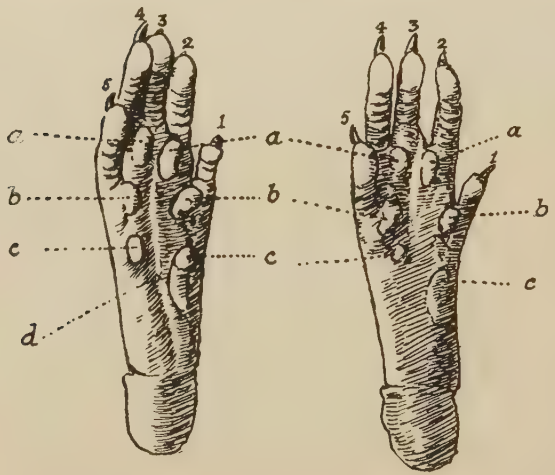
A systematic description of the rats in question, which included the following groups: *Chiropodomys gliroides*, Blyth (tree-rat); *Nesokia setifera* (Horsf.); *M. rattus*, L., in two varieties, of which the one has a grey abdomen and the tail longer than the body plus head, the female having 5 pairs of mammae, and the other has a white abdomen, a tail not longer than body plus head and 6 pairs of mammae; *M. decumanus*, L., with also a melanistic variety of colouring; and *M. concolor* Blyth, a smaller variety of *M. rattus*. The second variety of *M. rattus* is a field rat, corresponding to *M. diardii* of Jentink; the first is chiefly a house-rat but apparently invades the fields at certain seasons of the year, viz. July to October, and it corresponds to the *M. rattus griseiventer*, Bonhote, found in Malaya. A short description is also given of other rats hitherto recorded as occurring in Java, viz. *Pitechir melanurus*, Cuvier (tree-rat), *M. bartelsii*, Jentink (hill-rat), *M. lepturus*, Jentink, *M. jerdoni*, Blyth (hill-rat), as well as *M. musculus*. The author states that while the long-tailed *M. rattus* is the common house-rat in Java, in the Papuan houses in New Guinea he found a quite different rat, viz. *M. browni*.

J. H. S.

De Raadt (O. L. E.). **Beitrag zur Kenntnis der Unterschiedsmerkmale zwischen javanischen Haus- und Feidratten in Beziehung zu der Epidemiologie der Pest auf Java.** [On the Differentiation of Field and House Rats with reference to Plague in Java.]—*Mededeelingen van d. Burgelijken Geneeskund. Dienst in Nederl.-Indië.* 1913. Vol. 2. No. 2. pp. 32-37. With 1 plate.
Bijdrage tot de Kennis der Onnderscheidskenmerken tusschen Javaansche Huis- en Veldratten met Betrekking tot de Epidemiologie der Pest op Java.—*Geneeskund. Tijdschr. v. Nederl.-Indië.* 1914. Vol. 54. No. 1. pp. 31-37. With 3 plates.

Of the three varieties of *M. rattus* found in Java, *M. rattus griseiventer*, Bonhote is a house-rat considerably infested with fleas, *M. concolor*, Blyth is also a house-rat, while *M. rattus diardii*, Jentink, is a field-rat with a relatively small number of fleas. The two former are therefore of much the greatest importance in connection with plague. The females are readily distinguished by the number of mammae, but it is not always possible to distinguish the male field-rat from the male house-rat by the usual criteria of colour and length of tail. This can be done, however, by the pads on the hindfeet. This criterion was used by Hossack to distinguish *M. decumanus*, *M. rattus* and *Nesokia bengalensis*, but can equally be used to distinguish the house from the field varieties of *M. rattus*, at least in Java. The plantar surface of the foot shows three rows of pads arranged in pairs. The most distal pair are situated one at the base of the second toe, the other at the bases of the third and fourth toes, and the middle pair lies at the bases of the first and fifth toes. Of the proximal pair one has its long axis corresponding with the long axis of the foot, and the other,

1. 2.



1. 2.

1. *M. rattus griseiventer* Bonhote (house rat).
2. *M. rattus diardii* Jentink (field rat).

a.a. distal pads. *b.b.* middle pads. *c.c.* proximal pads. *d.* depression or furrow between proximal pads, and extending along sole of *M. rattus griseiventer*. [To illustrate de RAADT'S paper.]

smaller, lies about midway between the heel and the longest toe. It is this proximal pair which affords a means of distinguishing between the house and field varieties of *M. rattus*. In the house-rat both pads are raised definitely above the general level of the sole of the foot, producing between them a distinct depression or furrow. In the field-rat the last described pad is usually rudimentary and rises, if at all, very slightly above the general level and the other pad is also much less developed than the prominent wart-like pad of the house-rat. There is thus no furrow and the sole is almost flat in front of the heel. Transitions occur but, using this criterion alone, the writer in 1,000 house-rats found only 4 per cent. of doubtful cases and in 1,131 field-rats again only 4 per cent. of doubtful cases. The difference is said to be easily learned and to be more reliable than shades of colour. Generally speaking the development of the pads corresponds with the habits of the animal in respect to climbing; the greater the tendency of a rat to climb, the more prominent being the development of the pads. A series of photographs is given to illustrate the development in different kinds of rat. J. H. S.

Strickland (C.). **The Biology of *Ceratophyllus fasciatus* Bosc., the Common Rat-Flea of Great Britain.**—*Forty-Second Ann. Report of the Local Govt. Board* 1912-1913. Supplement containing Report of Medical Officer for 1912-1913. Appendiz B. No. 5. pp. 401-412. 1914. London: Printed under the Authority of H.M. Stationery Office. [Cd. 7181.]

This paper details an investigation into the biology of *C. fasciatus* in the various stages of its cycle, and should be compared with the paper by Bacot covering similar ground (see this *Bulletin*, Vol. 3. p. 204). Both observers find that the duration of the various stages is very variable under apparently similar conditions, and is most influenced by temperature and humidity. The presence of rubbish or sheltering material protects the flea in all stages to a marked extent even from conditions which are fairly severe. The imago feeds readily on several facultative hosts, and Strickland states that man appears to be even more attractive to it than the rat. But it will not copulate unless fed on rat's blood, and even after starvation for some weeks followed by a single feeding, copulation is always followed by oviposition within 24 hours. In protecting rubbish the imago will live unfed for 17 months, and unprotected in favourable conditions for one month. J. H. S.

Ross (H.). **A Note on the Fleas infesting the *Mus Rattus* in Naini Tal and Mussoorie.**—*Proc. Second All-India Sanitary Conference, 1912.* Vol. 3. pp. 88-89. (1913. Simla: Govt. Central Branch Press.)

A record of the flea counts obtained during the months May to October [1912 (?)], based on the examination of from 120 to 300 rats per month, and showing the relative proportions of *X. cheopis* and *C. fasciatus* during this period. An increase in the counts occurred in the rainy seasons, August to early October, reaching the figure of 4·5 per rat in September, and falling off again quickly at the end of October. *X. cheopis* was always present in the greater numbers, but whereas the proportions in May to June were as 1·4 to 1, in August it was 12 to 1, and in September and October as 7·4 and 6·6 to 1. J. H. S.

TROPICAL SKIN DISEASES.

CHALMERS (Albert J.) & O'FARRELL (W. R.). **The Trichonocardiases.** —*Ann. Trop. Med. & Parasit.* 1913. Dec. 30. Vol. 7. No. 4. pp. 525-540. With 2 plates.

Trichonocardiasis is a name applied to a parasitic disease affecting the shafts of the hair. The parasite does not penetrate into the hair follicle. CASTELLANI named the disease Trichomycosis axillaris and subdivided it into three varieties, flava, rubra and nigra, but as the affection also occurs on the hairs of the pubes, in some cases without any axillary infection, the authors believe that the name Trichonocardiasis is better. The three varieties of the condition have been found in the Anglo-Egyptian Sudan and Chalmers observed a condition resembling Trichonocardiasis flava in Europeans on the Gold Coast in 1898. All three may be found on the same person. The parasite which causes them has been named by CASTELLANI *Nocardia tenuis* and in some instances it is associated with micrococci, e.g. *Micrococcus nigrescens* (Castellani, 1911) and *M. castellanii*, Chalmers and O'Farrell, 1913. A description of the causal parasite and these cocci is given.

The disease apparently spreads from man to man and the incubation period is from two weeks upwards. The infection causes no general symptoms and is only discovered by accident. The health of the hair is not affected. The infection does not appear to be in any way associated with excessive sweating.

It appears to have a marked tendency to remain in the region or regions which it first infected and does not tend to spread over the body. For treatment a lotion of one drachm of formalin to one ounce of water applied twice daily to the affected hairs with a two per cent. sulphur ointment at nights is recommended by CASTELLANI. A coloured plate and a plate of microphotographs show the appearance of the affected hairs and the characteristics of the fungus in cultures and microscopically.

G. C. Low.

CHALMERS (Albert J.) & STIRLING (A. D.). **Epidemic Trichonocardiasis.**—*Ann. Trop. Med. & Parasit.* 1913. Dec. 30. Vol. 7. No. 4. pp. 541-544. With 2 figs.

An account of an epidemic of Trichonocardiasis rubra. A private in the Welsh Regiment stationed in Khartoum applied for medical treatment on account of irritation of the skin in both axillae. The occurrence of the case led to a systematic examination of the regiment when no fewer than 42 other cases were discovered. An investigation made as to the possible source of infection threw suspicion upon the washermen of the regiment. CASTELLANI'S formalin lotion and two per cent. sulphur ointment were applied, the results being excellent, but the treatment required time, cure not being effected under three to four weeks. If the cases did not improve under the above treatment, an application of tincture of iodine effected a cure in three to four days. Tincture of iodine alone was not specially efficaceous. In the authors' opinion the best remedy was a formalin sulphur application for two days, followed by tincture of iodine.

G. C. L.

Johns (Foster M.). **The Occurrence of the Trichonocardiases in New Orleans.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1914, May. Vol. 1. No. 11. pp. 782-786. With 1 plate.

The author refers to Chalmers and O'Farrell's article on Trichonocardiasis in the *Annals of Tropical Medicine and Parasitology* [see above.] He records the case of a medical student in Tulane University who suffered from the red and yellow variety, the fungus attacking the hairs of his axillae. The causative fungus of the disease, *Nocardia tenuis* [not *Mocardia tennis* nor *Mocordia tennis* as used throughout the paper] was found. Some cultural experiments were conducted with the parasite and the author points out in his conclusions that, as the disease exists in New Orleans as well as in other parts of the world, it is probable that it has a world-wide distribution in tropical and subtropical countries.

G. C. L.

Priestley (Henry). *Microsporon scorteum* **(n. sp.) from a Case of Ringworm in Man.**—*Ann. Trop. Med. & Parasit.* 1914. April. 21. Vol. 8. No. 1. pp. 113-117. With 1 plate.

The author states that skin diseases due to parasitic fungi are not of very frequent occurrence amongst the population of Queensland. He therefore believes it of interest to record a case from the lesions of which a fungus new to science has been isolated. The patient was about fifteen years of age and showed two circular inflamed areas of about 30 mm. in diameter on the skin of the outer side of the calf. The edges were well defined and inflammatory changes were only noticed in the peripheral parts, which were slightly raised. There was no scaliness, nor did the hair seem to be affected. There was slight itchiness in the affected areas but beyond that there were no subjective symptoms. The lesions cleared up of themselves in about four weeks, the only treatment being scrubbing with soap and water. Microscopic examination of hairs from the lesions showed them to contain only a very few spores and little mycelium.

The most striking feature in the development of the parasite was the early appearance of great numbers of multiseptate spores; though a few were unicellular, the majority had from three to six divisions and varied in length from 35 to 60μ with a width of 11 to 4μ. In most of the cultures lateral conidia were scanty, and chlamydospores were infrequent and not sharply defined within the mycelial threads except in some old cultures.

The systematic position of the fungus, according to the author, is difficult to decide as it presents characters belonging to the trichophytons and also to the microsporons. The great abundance of the multiseptate spores, the pectinate bodies and the formation "en raquette" of certain mycelial elements would place it amongst the microsporons, while on the other hand the presence of spirals and nodular bodies together with the absence of spines on the multiseptate spores would place it amongst the trichophytons. The author finally decides that the parasite belongs to the quick growing microsporons of animal origin, but he has been unable to trace the source of infection. Attempts to infect guinea-pigs were unsuccessful. In some ways the microsporon resembles *M. fulvum* as described by Uriburu (1909)

but as spirals have not been described for that parasite and fine mycelial outgrowths are absent in the Australian one, the author comes to the conclusion that the latter is a new species. On account of the resemblance of the cultures to chamois leather he proposes the name *Microsporon scorteum* for it.

G. C. L.

JOYEUX (Charles). **Contribution à l'Etude des Teignes Africaines.** *Trichophyton Soudanense.—Arch. de Parasit.* 1914. Mar. Vol. 16. No. 3. pp. 449-460. With 6 text figs., and 1 plate.

In a preliminary note (*Compt. Rend. Soc. Bis.*, 1912. Vol. 73, p. 15) the author recently described a new species of *Trichophyton* met with in Upper Guinea. He now gives a more complete description of the parasite, adding some other remarks on the tinea of that country. As in Europe, such diseases are best seen in children, the affections tending to disappear as adult age is reached. The new *Trichophyton*, cultivated in a similar manner to others in a collection of the hospital of St. Louis by Dr. SABOURAUD, offers sufficient differences for it to be considered a new species. It differs from the other Trichophytons of the *endothrix* group—*crateriforme*, *acuminatum* and *violaceum*—by its form and colour; it shows neither the fissured appearance of *T. effractum*, nor the umbilicated aspect of *T. umbilicatum*, nor the crateriform appearance of *T. regulare*. It seems therefore, to the author, legitimate to make it a new species.

The characteristics of the new fungus on different culture media are described. Inoculations have always proved negative, guinea-pigs and rats having been experimented with.

The name "Soudanense" has been given on account of the geographical area in which the cases were found.

G. C. L.

MONTGOMERY (Douglass) & CULVER (George D.). **Eczema marginatum of the Toes.**—*Jl. Amer. Med. Assoc.* 1914. Apr. 4. Vol 62. No. 14. pp. 1076-1078.

SABOURAUD has demonstrated, the author points out, that a number of cases that used to be regarded as eczema of the toes are really dermatitis caused by the same fungus that produces eczema marginatum (Dhobi's Itch) of the crutch. SABOURAUD has named the fungus *Epidermophyton inguinale*, this resembling, but not being identical with the ordinary ringworm fungus. The parasite lives on the skin and does not attack the hair. It gives rise to its most characteristic lesions on the inner side of the thighs of the male, against which the scrotum rests. The disease may also occur in the axilla and in women under the breasts, while as now stated the toes may also be affected. When found in the latter situation it gives rise to a disease resembling intertrigo or eczema. The authors describe a case in which the toes of the right foot were attacked. The infection was very persistent but eventually active treatment—chrysarobin ointment chiefly—killed the fungus out and cured the disease. For such cases SABOURAUD employs a one or two per cent. chrysarobin ointment, WHITFIELD a ten per cent., while in the case above mentioned a five per cent. strength was used.

G. C. L.

Culpepper (W. L.). **A Case of Dhobie Itch (Tinea Cruris) with Notes on the Thermal Deathpoint, Gross and Microscopical Drawings of the Causal Fungus** (*Epidermophyton Rubrum*).—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1914. Feb. Vol. 1. No. 8. pp. 584-587. With 1 text fig. & 1 plate.

A water bath in which experiments on the thermal death point of the fungus were made is first described in detail; it was determined to be 80° C. for ten minutes. A table gives the results of the experiments. Numerous attempts to infect guinea-pigs, rabbits and white mice were made, but all proved unsuccessful. The author however succeeded with himself by scarifying a place with a scalpel and rubbing the fungus on it.

In eight days a small lesion resembling that of ringworm was noticeable. Ten days later the lesion was about the same size but was longer, of an irregular abrupt form, angry red colour and somewhat elevated round the edges. Scales from this were inoculated on Sabouraud's medium and in eight days a growth appeared round one of these. Smears made from the growth on the skin also showed the fungus. Twenty-one days from the date of inoculation 80 per cent. carbolic acid was applied to the spot, with the result that all symptoms disappeared leaving a small white scar behind.

G. C. L.

Castellani (Aldo). **Tinea Imbricata (Tokelau).**—*Brit. Jl. of Dermatology.* 1913. Dec. Vol. 25. pp. 377-400. With 25 figs.

The author defines the term "Tinea imbricata" as a tropical dermatomycosis, or more correctly a group of dermatomycoses, due to fungi of the genus Endodermophyton. Clinically the disease is characterised by the presence of extensive, flaky, scaly patches, the scales being large, tissue-paper-like, firmly adherent by their bases and arranged in concentric rings or parallel lines. The name Tinea imbricata was given to the disease by Manson, who studied the condition in China from 1879 to 1882.

The author, using special technique, has succeeded in growing the fungus causing the disease and has shown that if this is inoculated into human beings the typical disease is reproduced. Three species of Endodermophyton are described as being found in man: *E. concentricum*, *E. indicum*, these causing Tinea imbricata, and *E. castellanii* causing Tinea intersecta. The characteristic growths of these different fungi are given in detail in the paper. [Those interested should consult the original.]

The disease has an apparently different clinical picture from any other type of body ringworm; inflammatory signs are totally absent. As regards prognosis the disease has no tendency to spontaneous cure and the treatment is difficult; the general health is not much affected but in hot weather itching is very troublesome. In chronic cases anaemia, general weakness and emaciation have been noted.

The author has tried many different treatments. Chrysarobin ointment (five to ten per cent.) in repeated applications often induces rapid improvement in cases which are not of long standing. The eruption however comes back again very shortly and during the application of the drug the patient must be watched carefully and

the urine regularly tested. Resorcin dissolved in compound tincture of benzoin (60 to 120 gr. of resorcin to 1 oz. of the tincture of benzoin) is now used as a routine treatment for the disease in the Colombo hospital. This is freely applied once or twice daily to the affected regions. In cases where the whole body is affected, half the body is painted one day and the other half the next and so on alternately. The treatment must be continued for several weeks and during that time the patient may be given several hot baths and scrubbed well over with sand soap. Strong liniment of iodine has also been used. If seen early, while in isolated patches, it is easy to cure, but when advanced it is extremely difficult.

The paper is well illustrated, a coloured plate and many very excellent photographs, both of the cultures of the fungus and the skin lesions, being incorporated in the text. G. C. L.

Vasconcellos (Figueiredo). **Contributions à l'Etude des Dermatomycoses du Brésil.** i. *Trichophyton griseum* **n. sp.**—*Mem. do Inst. Oswaldo Cruz.* 1914. Vol. 6. No. 1. pp. 11-17. With 2 plates.

The ringworm, of which the author describes the parasite, was first observed by Paulo Parreiras Horta who isolated the fungus producing it. The patient presented a lesion, roughly 4 cm. by 3, over the radial border of the flexor aspect of the left forearm, just above the wrist. The lesion had a somewhat oval form and presented an elevated surface resembling in some ways the plaques of lichen planus. At the edges of the lesion, which was a yellow grey colour, were some intact vesicles and some scales which were formed by the ruptures of other vesicles. When these were treated by liquor potassae small spores and filaments became evident. Sown on Sabouraud's maltose gelatin a pure culture of the fungus was obtained. A detailed account of its different appearances on various culture media is given and from these the author concludes that the trichophyton is a new one though related to the *Trichophyton gypseum* group of Sabouraud. At first white, the growth later becomes grey, and therefore the name *Trichophyton griseum* is proposed for it.

Multiseptate filaments which originate from the mycelial extremities are very abundant and conidia are also numerous, but the author has not detected spiral forms which are present in certain of the trichophytons of this group.

Photographs showing the lesions on the arm and the appearances of the culture are given, the latter also being depicted on a coloured plate.

G. C. L.

Pinoy (E.). **Un Traitement des Mycétomes.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 710-711.

Iodide of potassium, which produces such good results in the treatment of actinomycosis and sporotrichosis, appears to produce little effect on mycetoma, though the parasite of this disease resembles that of actinomycosis. Recently Nicolle and Misk are said to have obtained cures by the employment of iodide of potassium internally with local applications of iodine and iodide, the one in a case of mycetoma due to *Madurella tozeuri*, the other in a case due to *Madurella*

mycetomi. The author regrets that these observations have not been published. He believes however that if one can favourably combat the local oedema which accompanies mycetoma the action of the iodide will be more favourable. His treatment consists of submitting the patient to a diet free of chlorides and making, at the level of the oedematous lesions, deep openings by means of the thermocautery. Iodide of potassium is then given in doses of four to six grammes per day. If the patient complains of the absence of salt in the diet, this can be supplied to the food by means of iodide, provided that one does not pass the amount of two or three gm. for a litre of bouillon or a pound of meat. G. C. L.

Brault (J.). **Note à propos de l'Enantiothamnose.**—*Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 90-91.

In the month of January 1911 the author observed three projecting tumours, in an Arab, in the region of the umbilicus. These in their general configuration reminded him of Molluscum contagiosum. Cultivations however showed that a fungus was present in a state of purity, this being identical with that found by the author in numerous cases of what he has termed pseudo-molluscum. The histopathology and experimental work on cultivation is not entered into in this note. The fungus has been classified by Pinoy, to whom the author sent cultures and sections showing the parasite *in situ* in tissues. He calls attention to the fact that Brumpt in his *Précis de Parasitologie* has given the wrong measurements for the septate filaments.

G. C. L.

Hornsey (John F.). **Dermatitis Venenata due to Rungus.** [Memoranda.]—*Brit. Med. Jl.* 1914. Apr. 4. pp. 759-760.

A form of dermatitis is described due to contact with any part of a tree called by the natives of British North Borneo rungus or ringus. The tree is found especially in the district of Maruda Bay. Within 24 hours of handling the tree the skin becomes affected with a most intolerable itching; this is soon followed by the appearance of a rash consisting of clusters of raised red papules, which are noticed first on those portions of the body which have actually come into contact with the plant, and later over the rest of the body. With the rash the temperature is raised and there is a general sensation of malaise. Within 48 hours the papules become vesicles, or even large bullae, filled with a clear serous fluid. These, after becoming confluent, burst and yellow crusts are formed. In severe cases the bullae become infected with ordinary cocci and, as a result, foul ulcers are seen, covering in many instances a large part of the body.

If left untreated, the disease generally runs a course of five to seven days in mild cases; healing takes place naturally with very little permanent disfiguration unless the patient has scratched the lesions. When pus-forming organisms secondarily attack the lesions permanent scars may be left. The author has seen pneumonia occurring as a sequel, especially in cases where the mouth and nostrils were affected. Coolies cutting wood and jungle often get infected from handling these trees. The leaves resemble those of the jaborandi.

G. C. L.

Chazarain-Wetzel. **Un Cas d'Eczéma de la Laque.**—*Bull. Soc. Méd.-Chirurg. de l'Indochine.* 1914. Apr. Vol. 5. No. 4. pp. 126-128.

A militiaman, whilst searching for wood in a forest, found himself in the vicinity of a lacquer tree which the Annamites call "Cây-Son." He did not brush against it nor touch it. After his return a general inflammation and oedema appeared on his face. On the following morning he was taken into hospital. The oedema was then very pronounced, while the lips and eye-lids were also swollen, the latter so much that he could not open his eyes. There was no fever. The following day a vesicular eruption appeared on the nose and ears. The treatment adopted was a saline purgative with inunctions of boracic vaseline and an ointment of oxide of zinc. On the third day the oedema had diminished, on the fourth the eruption was much less intense, whilst on the sixth day it had completely disappeared except on the ears. On the tenth day the cure was complete.

Cases of this affection are relatively frequent in Indo-China, especially amongst the natives, who affirm that it is not necessary to touch the tree with the skin, walking in the undergrowth in the vicinity being sufficient. In the Province of Bac-Kan a notion is prevalent that the odour of the tree is sufficient to give one eczema. The author asks "Is it not possible that the plant *Rhus vernicifera* throws out a volatile toxic acid during the summer months?" The incubation of the malady would seem to be 24-36 hours.

Degorce, who joined in the discussion, recorded the case of an Annamite child twelve years of age who exhibited an erythematous vesicular eruption on all the uncovered parts of the body—face, neck, hands, wrists, feet and lower parts of the legs. This child stated that before the eruption appeared he had approached lacquer trees during his work, but had not touched them. The eruption was cured quickly by applications of oxide of zinc.

Mathis stated that the plant which had given rise to these lesions was probably, according to the information furnished by Crevost (Director of the Tonkin Museum), a species of *Rhus semialata* (Murr), in Annamese *cay-muoi*. The species cultivated for the liquid lacquer is *Rhus succedanea* (Linnaeus), in Annamese *Cây son*. In Tonkin no other species of trees from which lacquer is obtained is known, for example such trees as are found in Southern Indo-China, *Melanorrhea usitata* (Wall) and *M. laccifera* (Pierre). As for *Rhus vernicifera* (De Candolle), that is a species found in Japan which has not yet been discovered in Indo-China.

G. C. L.

Blanchard (M.). i. **Inoculations expérimentales de l'Ulcère Phagédénique Tropical.**—*Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 96-101.

Le Dantec (A.). ii. **Priorité de la Découverte du Bacille du Phagédénisme Tropical et de la Pourriture d'Hôpital.**—*Ibid.* Apr. No. 4. pp. 262-268.

iii. *Ibid.* May. No. 5. pp. 376-380.

i. The author first refers to the association of fusiform bacilli and spirilla described by Vincent and Le Dantec, which is generally

admitted as the cause of phagedenic tropical ulcer. He states that the pathogeny of the affection is still uncertain. All attempts at inoculation have so far been followed by negative results. Le DANTEC in a single case produced in a guinea-pig an ulcer similar in some respects to phagedenic ulceration by placing a splinter of bamboo soiled with earth under the skin of the dorsal region. All other attempts, however, failed.

The phagedenic ulceration of the Congo, with which the present author has experimented, possesses all the clinical and microbiological characters of the classic description. He inoculated men and guinea-pigs. For the human inoculations a fragment of tissue about the size of a lentil was taken from the ulcerated area of a patient suffering from the disease. This was then divided into several pieces, all microscopically showing an abundance of fusiform bacilli and spirochaetes with very rare diplococci. Seven inoculations were made, chiefly where it was not likely for phagedenic ulceration to occur. In none of the cases was any reaction produced, all the small incisions cicatrising in three or four days without any trace of ulceration. Microscopic examinations also showed that the spirochaetes disappeared in twenty-four hours and that the fusiform bacilli were rapidly ingested by the phagocytes.

In another series of cases an aseptic necrosis was produced before the inoculation was made. Two drops of a very concentrated solution of potassium hydrate were placed about ten centimetres apart over the skin of the deltoid region. Five days after, as the points of necrosis did not present any trace of infection, one of them was inoculated with phagedenic material. By this means ulceration was produced, the discharge containing spirochaetes and bacilli. Further confirmation was obtained by the second necrotic spot, which had remained perfectly free of infection up to the eighth day, finally becoming infected through the soiled dressings which covered the first ulcer.

The inoculations in guinea-pigs were made after producing a local necrosis with potassium hydrate. The material inoculated was obtained from the same source as in the experiments described above. The result was negative. Ulceration took place at the point of chemical necrosis, but the germs found were not those of phagedenic ulceration, no spirochaetes nor fusiform bacilli being noted.

Blanchard's experiments then show that phagedenic tropical ulceration can be transmitted direct by contagion from man to man.

ii. After the reading of Blanchard's paper VINCENT protested against the name of Le Dantec being associated with his as regards the discovery. Le Dantec however now claims that he first saw a bacillus in 1884 in French Guiana in this condition, while VINCENT first described the spirillum which now goes by the name of *Spirochaeta schaudinni*. VINCENT, who joined in the discussion, said that the bacillus he called fusiform never has spores, whereas that described by Le Dantec apparently has.

iii. In the second paper Le Dantec returns to the attack and criticises VINCENT'S remarks. He reprints his paper of June 1885 in the *Archives de Médecine Navale* to support his contentions, and still believes that his name should be given as one of the discoverers of the bacterial association which characterises tropical phagedoena.

G. C. L.

Bernard (P. Noël). **Recherches sur la Pathogénie de l'Ulcère phagédénique des Pays Chauds.**—*Bull. Soc. Path. Exot.* 1914. Mar. Vol. 7. No. 3. pp. 176-179.

Phagedenic ulceration in Indo-China is similar in its clinical characteristics and microbiology to that seen in other parts of the Tropics. The author studied such a case both bacteriologically and experimentally. A coccus, strictly anaerobic, was grown, which when inoculated under the skin of guinea-pigs gave rise in five to six days to an abscess about the size of a nut with an indurative base. This gradually resolved and disappeared in about ten days. Intraperitoneal inoculation was negative, while inoculation under the skin of rabbits gave the same results as in the guinea-pig. Cultures made in Indo-China died out before they reached Paris two months later.

G. C. L.

Heymann. **Traitement par les Rayons X des Ulcères phagédéniques tropicaux.**—*Ann. d'Hyg. et Méd. Colon.* 1914. Jan.-Feb.-Mar. Vol. 17. No. 1. pp. 87-96.

After treating five cases of tropical phagedenic ulcer by X rays the author concludes that the rays exercise their most favourable action on the cicatrisation of the ulcers, at least of those which have not reached the deeper layers. The mode of treatment appears superior to others because it is followed by a rapid cure and by the disappearance of all pain in the first few days.

G. C. L.

Whyte (G. Duncan). **An Undescribed Form of Ulcer met with in the Tropics, with Observations on its Treatment (Based on the Study of Eleven Cases.)**—*Trans. xvii International Congress of Medicine.* London. 1913. Sect. xxi. Trop. Med. & Hyg. Part. 2. pp. 83-85.

The ulcer is met with exclusively in old men. It is characterised by " (*a*) the rapidity of its spread by undermining and causing sloughing of the superficial layers of the skin ; (*b*) the complete cessation of spread and the rapid healing of the ulcer upon treatment with a lotion (such as hydrogen peroxide or a solution of one of the permanganates) from which oxygen is set free."

Eleven cases were seen during the last six months of 1912, all amongst the male in-patients admitted to the Swatow Hospital, China, during that period. In nine the ulcer was on the leg, in one case on the fore-arm, and in another on the shoulder. [No bacteriological examinations seem to have been made of the condition, so it is difficult to say to what it is due.]

The best treatment was the application twice daily for three days of dressings saturated with hydrogen peroxide, this checking the spread of the ulcer. After this the application of mild ointments was soon followed by complete healing.

G. C. L.

Corleis. **Beitrag zur Kenntnis und Therapie der Hautmaulwurfkrankheit. ("Creeping Disease" der Engländer und "Wolossjatik" der Russen).** [A Contribution to the Knowledge and Treatment of Creeping Disease.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. Apr. Vol. 18. No. 8. pp. 285-286. With 2 text figs.

While creeping disease is seldom seen in West Europe, it is however relatively frequent in Russia especially in the Ural district. The author quotes Castellani and Chalmers as saying that larvae of the genera *Gastrophilus*, *Oestromyia* and *Hypoderma* are found in different cases of this condition.

Corleis has twice obtained a larva from the cheeks of a patient whom he believed was suffering from this disease, and illustrates the same by photographs. Tincture of iodine was found to be of use in the treatment and proved more efficacious than drugs used formerly.

[The author apparently has not had the larvae identified.]

G. C. L.

Gougerot & Voillemot. **A propos d'un Cas de Craw-craw : Traitement par l'Hectine et le Permanganate de Potasse.**—*Bull. Soc. Française de Dermatol. et Syph.* 1914. Jan. Vol. 25. No. 1. pp. 22-27.

The authors first refer to our imperfect knowledge of the etiology and treatment of Craw-craw, a name first employed by Emily to designate a dermatitis very common on the Congo and upper Oubanghi. They describe the case of a man 28 years of age who had a small abrasion on his right heel produced by the chafing of a new boot. Following this an excoriated papule appeared on the posterior aspect of the right calf, and a very painful abscess. The latter was incised at the end of March 1913, but suppuration persisted till the end of April. In June 1913 a third lesion appeared communicating with the two first. This rapidly ulcerated and became chronic, the patient then presenting the excoriated papule of classical craw-craw and deep ulcer. Other physicians who saw the condition were also satisfied that this was craw-craw. From the 12th November to the 1st December the wounds were cauterised with an equal solution of potassium permanganate while hectine was given by the mouth. After the exhibition of these drugs recovery quickly took place.

Jeanselme, who joined in the discussion on the paper, pointed out that the name "Craw-craw" is used for very different cutaneous lesions; sometimes for dry papules, at other times for ecthymatous conditions. He believes that the condition seen by Emily on the Congo resembled oriental sore or tropical ulcer. On the West coast the natives have applied the term to pruriginous papules; in such papules filarial embryos were once discovered and named by Blanchard *Rhabditis Niellyi*.

[It is a curious and interesting fact that confirmation of the presence of these embryos in such lesions is still wanting.]

G. C. L.

Argaud (R.) & Brault (J.). **Contribution à l'Etude de l'Anatomie pathologique et de la Pathogénie de l'Aïnhum.**—*Bull. Soc. Path. Exot.* 1914. May. Vol. 7. No. 5. pp. 371-375.

The authors believe that it is more logical to explain the transverse

fissure which marks the separation of the toe as a result rather than as the cause of the osteolysis. They believe that certain nervous lesions which they have described permit them to bring forward the hypothesis of an initial medullary alteration. According to them ainhum is the result of a trophoneurosis at the point of the medullary disappearance, a trophoneurosis very limited, absolutely symmetrical, ending in osseous alterations just as in tabes.

The authors also studied leprous lesions in digits and came to the conclusion that the histopathology of these lesions is identical with that of ainhum. They do not however consider that it is necessary to conclude that ainhum is a manifestation of leprosy because identical lesions can result from different causes.

G. C. L.

Chalmers (Albert J.) & Christopherson (J. B.). **Murmekiasmosis Amphilaphes.**—*Jl. Trop. Med. & Hyg.* 1914. May 1. Vol. 17. No. 9. pp. 129-135. With 3 plates.

The above name has been coined for a peculiar form of cutaneous wart characterised by its extraordinary facility for growth, which causes it to spread and to occupy practically the whole of the side of the face and neck. The name is derived from the Greek, Murmekia—anthill and Amphilaphes—spreading. Galen invented the word "Murmekiasmos" from "Murmekia" to denote the breaking out of warts on the body.

Microscopically the points of interest about this curious wart growth are the presence of numerous cryptococci, and the fact that the lesions are largely composed of an adenomatous structure derived from the sebaceous glands. A similar disease has been seen in England, but Lilley who described it does not mention the presence of cryptococci nor the connection of the growth with the sebaceous glands. As regards prognosis, the warts do not appear *per se* to endanger life, but they destroy adjacent structures such as the eye and, when they enter the pharynx, the larynx may also become involved. If freely removed they apparently do not recur. It is important that this should be done as early as possible and the authors recommend the prompt removal of any persisting warts on the face, especially if they have dated from early years of life and show a tendency to spread. A short account of the literature of the subject is given, and the article is illustrated with three plates, showing the clinical appearances in an infected individual, and photographs of the cryptococcus and the histopathology of the lesions.

G. C. L.

Barlow (N.). **Impetigo Tropica.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1914. May. Vol. 1. No. 11. pp. 789-791.

The author states that in Honduras and other places on the Caribbean Sea a skin affection allied to the impetigo contagiosa of temperate zones is seen. It is much more rebellious in its course than that condition however, and the prognosis accordingly is more doubtful. The lesions are caused by a staphylococcus and the eruption, which is commonly seen in children, appears in successive crops. The sites of predilection are in order, the legs, fore-arms, hands, feet, fingers,

thighs, arms, scalp and, in contrast to impetigo contagiosa, last of all the face. Each crop may number from ten to fifty lesions, while occasionally new lesions are formed near old ones by autoinoculation from scratching. In adults the disease seldom occurs and then usually only a single patch on the hand or foot or adjacent sides of two fingers.

If left untreated the disease may persist indefinitely. Various treatments have been attempted by the author; the most efficient are as follows :—

" 1. Careful removal of crusts and horny layer above all vesicles and the margins of all patches, following by painting with tincture of iodine.

" 2. Keeping all affected parts bandaged with a paste of powdered boric acid and glycerin, containing 2 to 4 per cent. ammoniated mercury; with daily gentle scrubbing and removal of the tops of vesicles.

" 3. Gentle scrubbing with solution of mercury bichloride, 1–1,000, followed by ointment of ammoniated mercury, 3 per cent.

" 4. 25 per cent. sulphur ointment.

" The first method is scarcely applicable to children, but is the quickest cure for the single lesions of adults. A patch is often completely healed in four days."

G. C. L.

Loiselet. **Acanthosis nigricans. Un Cas vu à Madagascar.**—*Rév. de Méd. et d'Hyg. Tropicales.* 1913. Vol. 10. No. 4. pp. 204-205. With 2 plates.

The patient was a native of the Tanala race inhabiting the dense forest in the environs of Ihosy. He was a man of about 30 years of age, strong and robust, but with a slightly enlarged spleen due to attacks of malaria. His skin lesions were limited to the neck and both axillae; they were painless. They had lasted for two years. The author describes them as follows. The skin was very much thickened and warty looking, the papillae being augmented in volume and showing a flattened surface. To the hand they gave the sensation of an irregular surface, but no definite roughness was perceptible. Between the flattened surfaces irregular furrows and fissures produced a complicated network. No ulceration was present. The colour was dark black, the lesions having lost, however, the lustre of the normal black skin.

Jeanselme, to whom photographs were sent, stated as his belief that the case was one of *Acanthosis nigricans*.

The symmetry of the lesions, their indolence, the integrity of the skin at the point of infection, the verrucose and papillomatous appearance, and the pigmentation all tend to confirm this.

[No microscopic examination of the lesions seems to have been made.]

G. C. L.

Chalmers (Albert J.) & Byam (W.). **Vaccine Lichen in Natives.**—*Jl. Trop. Med. & Hyg.* 1914. May 15. Vol. 17. No. 10. pp. 145-148. With 5 figs.

Two separate detachments of Nuers and Nubas were vaccinated, 24 on February 10th, and 36 on February 23rd, 1914, with a supply of glycerinated lymph derived from a calf which was obtained from the Laboratories of the Egyptian Public Health Department in Cairo.

The vaccinia developed well in all the cases, but eleven of these, i.e. eight Nuers and three Nubas, developed a peculiar eruption. "Some seven to nine days after vaccination the patient complained of a sensation of itching in various parts of the body, but most commonly at first on the forearms. This was followed in a few hours by an eruption of dark-coloured maculae, which quickly became papules. They appeared first upon the backs of the hands and forearms, then on the back of the neck, then on the face, chiefly on the forehead, the chest and back, coming out in successive crops. The number of these papules varied considerably in different cases from a few dozen to several hundred." The fully developed papule was about the size of a large pin head and was sharply dome-shaped.

After lasting for four to five days the rash slowly disappeared, leaving a well marked desquamation where the papules had been present. The general appearance of the eruption before the papules appeared was that of a lichen, but it did not conform to any of the ordinary described types of that disease. The treatment adopted was rest and quiet, together with an antiseptic ointment for the skin. Recovery on these lines was rapid.

G. C. L.

Anderson (D. E.). **The Uta Disease as seen in Peru in 1913.**—*Trans. xviith International Congress of Medicine*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 2. pp. 309-310.

A description of the disease is given. It only thrives in high altitudes in Peru, in cold, damp, deep and narrow valleys up the eastern and western slopes of the Andes, 3,000 to 8,000 feet above the level of the sea. Its geographical distribution resembles in some respects that of verruga peruana. The author compares it with gangosa, and rightly points out that it is neither yaws nor leprosy. At the time when the paper was written the virus and carrier of the parasite was unknown.

[The Commission from the Department of Tropical Medicine of Harvard University has recently shown that this disease is a form of leishmaniasis (this *Bulletin*, Vol. 3, p. 142).]

G. C. L.

Benjamins (C. E.). **Over Naso-pharyngitis mutilans.** [On Naso-pharyngitis mutilans.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1913. Vol. 53. No. 4. pp. 584-603. With 2 plates.

The author proposes this name for a peculiar self-limiting destructive ulceration of the nose and soft tissues of the face, of which he met with four examples in the year 1902, when serving in the East Indies. The patients were all adult male natives and on account of their helpless condition were inmates of a hospital for incurables at Samarang. Photographs of the cases were taken at the time along with notes, with the intention of proceeding further with the subject, but circumstances prevented this and the author, on his return to Europe, now publishes his material for what it may be worth, for the benefit of others.

In all four cases the lesion began in boyhood, as an ulcer appearing on the nose, which gradually extended all over the face so as to produce

the hideous disfigurement shown in the photographs, along with loss of sight; but having extended thus far the process came to an end without any particular medical treatment, leaving a smooth cicatricial surface without any nodules. In its self-limiting nature such a process differs essentially both from lupus and leprosy and an examination for acid-fast bacilli in the mucus of the nose proved in every case negative. The larynx also in every case apparently remained exempt, or at least showed no symptoms to lead to its examination. From syphilis the condition differed in the total absence of lesions on any other part of the body. The author thinks that such cases are of the type described by Leys and Ziemann under the term "Rhino-pharyngitis mutilans" (*Jl. Trop. Med.* 1906. Vol. 9 and elsewhere), and proceeds to discuss the literature of the subject upon this hypothesis. There is a good bibliography at the end of the paper.

[Rhino-pharyngitis mutilans, of which the above four cases are typical examples, is more commonly known by the name of gangosa. At one time believed by some to be a sequela of yaws, it is now more generally considered to be a disease *sui generis*, the causative agent being unknown. A good description of the disease will be found in Castellani and Chalmers's "Manual of Tropical Medicine," 2nd edit., p. 1275 (G.C.L.).] J. B. Nias.

Stannus (Hugh Stannus). **Anomalies of Pigmentation among Natives of Nyasaland. A Contribution to the Study of Albinism.**—*Biometrika.* 1913. Oct. Vol. 9. Nos. 3 & 4. pp. 333-365. With 10 plates.

An interesting article on anomalies of pigmentation amongst natives. The author emphasizes the point noted by himself in all cases that in ordinary daylight in negro albinos the pupil appears black and there is no red colour seen as in European albinos. The explanation of this, he believes, lies in the fact that absolute albinism of the eye in negroes is very rare and that the amount of pigmentation present is sufficient to prevent a large light entry and reflexion. A note however appended by the Editor of *Biometrika* queries the correctness of this statement.

Cases of complete albinism are dealt with, histories of some being given. These he believes illustrate the following facts:—

"1. Albinism is common among the natives of Nyasaland.

"2. It is a family affection and often directly hereditary.

"3. Varying grades of albinism are met with in the same family.

"4. Almost every degree of albinism is met with.

"5. The degree may vary with age.

"6. A secondary laying down of pigment in the albinotic skin in spots is a not uncommon feature.

"7. Albinism is very generally associated with an unusual development of the lanugo hairs and less commonly with mal-development of the teeth.

"8. Piebalds are comparatively rare.

"9. Spotlings are less rare.

"10. There is a very definite class in which the spotling condition affects the penis only.

"11. Widely distributed leucoderma is uncommon.

"12. A localised form resembling that described by Ziemann is common, but intermediate cases between this form and a more generalised form are seen.

"13. Some congenital cases of spotlings resemble exactly some cases of leucoderma."

The rest of the paper deals with a general discussion of the same subject, PEARSON's views and those of other authorities being quoted. Those interested in the subject should consult the original.

G. C. L.

DE NAPOLI (Ferdinando). **L'Opera del Medico in Libia a proposito delle Malattie Venereo-sifilitiche e Cutanee predominanti nell'Oasi di Tripoli e sue Dipendenze.** [Medical Work in Lybia on Syphilitic and Cutaneous Maladies prevailing in the Oasis of Tripoli and its Dependencies.]—*Giorn. d. Med. Militare.* 1914. Feb. 28. Vol. 62. No. 2. pp. 94-124.

Various syphilitic manifestations are described. The most frequently contracted venereal diseases, however, are gonorrhoea and soft sores. Of other skin diseases impetigo, folliculitis, furunculosis, leucoderma, toxic eczemas, pigmentary conditions, erythemas and insect bites are mentioned.

Pediculis capitis and *Pediculis pubis* are rare, but *P. vestimenti* is more common, the parasite often preferring the head to other parts of the body.

Scabies is frequent. Myiasis of different forms is met with as well as typhus, kala azar and plague. Dermatomycoses due to different species of tinea are sometimes seen. Two cases of leprosy were studied, one a black man showing the tubercular form of the disease and the other anaesthetic. Some cases of chronic ulcer may have been tropical ulcer and the author believes he may have seen yaws.

G. C. L.

PAPPATACI FEVER, DENGUE AND UNCLASSED FEVERS.

PEIPER (Otto). **Ueber Malariabehandlung mit Hydrochinin. Ueber Papatacifieber.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. Apr. Vol. 18. No. 7. pp. 221-232.

Summer fever or Pappataci fever.—In 1910, MANTEUFEL observed a number of cases of fever at Daressalam which he concluded belonged to the group of dengue, summer or Pappataci fevers, and small biting flies said to be "Phlebotomus" were found in the houses. In 1912, he made a further communication on the same subject (this *Bulletin*, Vol. 1, p. 237). Since then the fever has been frequently observed and is now recognised by the Europeansthere. The symptoms are, fever of three to seven days, having a sudden onset with headache, prostration, muscular and joint pains like those of influenza, with almost always conjunctivitis, photophobia, pointed tongue, loss of appetite and constipation. In February 1913, one case showed an eruption (character not stated). No parasites were ever found in the blood, and quinine and hydroquinine were tried without success. A short summary of the most typical cases is given, the diagnosis being variously recorded as 3 day and 7 day fever.

[Most of these cases appear to be similar to those commonly seen in Greece, Asia Minor, India, and the Far East generally, and are probably local types of dengue though possibly several forms of infection are included. More information is required before they can be called pappataci fever, though it is very probable some of them were.]

P. W. Bassett-Smith.

CLARK (W. S.). **Report on Cases resembling Pappataci Fever, observed at Ibadan, S. Nigeria.**—*Yellow Fever Bureau Bull.* 1914. Apr. 7. Vol. 3. No. 2. pp. 145-147.

The author states that as pappataci fever has not been described from Southern Nigeria he has brought forward an account of some short febrile attacks affecting Europeans on the Residency Hill at Ibadan, which simulate this disease as found elsewhere. Three cases were observed throughout, and two others were seen at the end of the attack. The chief points given are, a short severe fever with a sudden onset, severe back pains, red tongue, and an almost normal pulse with a moderately high temperature. He states that mosquitoes of many kinds were abundant, and that sandflies were numerous and sometimes troublesome in the evenings. There does not appear to be sufficient evidence either epidemiological or clinical that these cases were really pappataci fever. The diagnosis was arrived at from the fact that the author was the only European not attacked, though his bungalow was equally infected with mosquitoes, but he rarely saw a sandfly there.

P. W. B.-S.

SPAGNOLIO (Giuseppe). **Sulla Epidemia di Febbre dei Tre Giorni osservata a Messina nell'Estate 1913 (Quarta).**—*Malaria e. Malat. d. Paesi Caldi.* 1914. Mar.-Apr. Vol. 5. No. 2. pp. 125-127.

The presence of three-day fever has lately been frequently noted in the neighbourhood of Messina and it appears to be spread directly by

inter-communication between the various ports of Sicily, occurring often in an epidemic form. From an economic and social point of view, it is of considerable importance as has been pointed out by DE LUCA (this *Bulletin*, Vol. 3, p. 328), whose observations are confirmed by the author. That the disease is spread by phlebotomus there is little doubt; the destruction of these, therefore, is the most important prophylactic measure.

P. W. B.-S.

ROUBAUD (E.). **Parasitisme chez les Reptiles du *Phlebotomus minutus Rond.* var. *africanus* Newstead.**—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 83-85.

In his description of *Phlebotomus minutus* var. *africanus*, NEWSTEAD showed that this variety had a wide distribution in Africa. The author brings evidence forward to show that it is abundantly present on the Ivory coast, and in Senegal. In the first area he observed a lizard at rest covered by the flies; the males were actively moving about on the scales but the females were more fixed with their abdomens distended with blood. This was a single instance only. In Dakka, Senegal, further evidence was obtained that these small flies have the habit of attacking reptiles. A large python in captivity was frequently noticed to have its back covered with the flies when it was at rest, and when moving these hovered as a cloud over it, to settle again when the snake was still. The bodies of the females contained blood, but the author was never able to find any blood parasites in them. He states that the common *Phlebotomus minutus* has been noticed to feed upon a species of gecko in India (this *Bulletin*, Vol. 2, p. 616).

P. W. B.-S.

KING (H. H.). **Observations on the Breeding Places of Sand-flies (*Phlebotomus* spp.) in the Anglo-Egyptian Sudan.**—*Jl. of Trop. Med. & Hyg.* 1914. Jan. 1. Vol. 17. No. 1. pp. 2–3.

Those who have studied the bionomics of the sandfly have generally found the larvae and pupae among damp stones, bricks, and tiles, or in caves and crevices of stone walls. The author some time ago found a single larva in the soil at Tokar, and he now records taking many in the soil of Khartoum from the garden of the Gordon college. He has also taken adult sandflies in crevices in rocks, in the beds of streams, and in holes of trees in the Bahr-el-Ghazal province, and in caves in the rocky hills two hundred miles south of Khartoum. In the northern desert they are sometimes found in enormous numbers far from any rocks, so that the soil may be an equally favourable breeding place. This is markedly the case in the cotton district of Tokar, where sleep sometimes is rendered impossible owing to the number of phlebotomus. It is probable that the flies can only breed in sandy soil which cracks on drying, into which the pregnant female descends to lay her eggs on the damp earth below the surface.

P. W. B.-S.

Birt (C.). **Phlebotomus Fever and Dengue.**—*Brit. Med. Jl.* 1913. Nov. 15. pp. 1297-1298.

This is an abridgment of a paper already published. [See this *Bulletin*, Vol. 2, p. 614.] Attention is directed to Finlay's experiments reported in the *Edinburgh Medical Journal* for the year 1894, in which he induced dengue-like attacks by the bites of *Stegomyia* infected with yellow fever.

G. C. Low.

Timpano (Pietro). **Sette Casi di Febbre Dengue a Bova Martina.**—*Malaria e Malat. d. Paesi Caldi.* 1914. Mar.-Apr. Vol. 5. No. 2. pp. 124-125.

The author describes seven cases of a disease resembling dengue, which he observed in September 1913 at Bova Marina (Reggio, Calabria). They were at first thought to be malaria, but the characteristic features of dengue were soon recognised. The pains in the back and limbs were severe, gastro-intestinal symptoms were marked and a morbilliform eruption appeared from the second to the fourth day followed by desquamation of a furfuraceous character with much itching. The onset of the fever was rapid, and the temperature fell when the eruption began to appear, the whole attack lasting about a week. In one case an inflammatory swelling of the parotid occurred, and in another bronchitis. The disease appeared when the weather was hot and damp at the time when malaria was common, but no parasites were present in the blood. It was probably introduced by a soldier from Libya or Tripoli; other similar small epidemics have been observed in Sicily, probably introduced in the same way.

P. W. B.-S.

Mitchell (Douglas A.). **Seven-Day Fever of the Indian Ports.**—*Statistical Report of the Health of the Navy for Year* 1912. pp. 186-191. 1913. London: H. M. Stationery Office.

An outbreak of a short fever, conforming to the type of the seven-day fever described by Rogers, occurred during December 1912, January and February 1913 in H.M.S. "Alert," on which the author was serving on the East Indies station. There were 20 cases and the symptoms as given were similar to those commonly seen in epidemics at Bombay, the primary and secondary rashes being particularly well marked, the secondary simulating that of rubella; excepting for the absence of arthritic pains they were those of dengue. The first eight cases were all mild, and were followed three weeks later by twelve others ten of which are described as severe. The duration of the pyrexia varied from 24 hours to ten days and the intermission was generally well marked, as also the relatively slow pulse. The differential diagnosis from measles is given very fully, and it is stated that dengue was easily excluded by the absence of joint pains.

[It is unfortunate that the temperature charts of the cases are not given in the published paper. This outbreak appears to be similar to the fever experienced in the "Manche," described below.]

P. W. B.-S.

Gouzien. **Fièvre indéterminée observée sur l'Aviso la "Manche" en September-October 1911.** [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.* 1914. Jan.-Feb.-Mar. Vol. 17. No. 1. pp. 233-235.

An epidemic of a fever presenting some unusual features occurred on board the transport "Manche" on the Annam coast. Many of the cases were sent into hospital at Haiphong and from these the author has made his observations. The course of the fever was of a marked saddleback type, with sudden onset, flushed face, suffused eyes and ephemeral rash, but without any marked joint pains or secondary rash as in typical dengue; the whole attack lasted about a week. This was followed by a short period of marked prostration. No parasites were found in the blood and quinine had no curative effect. It is noted as somewhat extraordinary that the cases were restricted to the "Manche," yet this ship was in constant communication with the shore. At the hospital at Haiphong they were treated in the general wards. It appeared as if the intermediary host, *Culex fatigans* or other similar carrier, was only present in the ships. It is also noted that previously several similar epidemics classed as dengue have been described from the "Manche," especially one in 1907 which presented almost exactly similar clinical signs as this one of 1911.

[The fever appears to be identical with that met with in Indian ports and particularly with recurrent epidemics as experienced in the Indian Defence Flotilla at Bombay harbour, which have been variously described as seven day fever or dengue. This epidemic has been previously described by Rouché (this *Bulletin*, Vol. 2, pp. 616–617).]

P. W. B.-S.

Wick (W.). **Morbilloid.**—*Arch. f. Schiffs-u. Trop.-Hyg.* 1914. May. Vol. 18. No. 10. pp. 345-350. With 3 temperature charts.

Under this name the author describes a disease which has been recognised for a long time in German New Guinea and of which an epidemic occurred at Raboul, New Pomerania, off New Guinea, in 1913. Hoffmann in 1902 reported a large number of cases of an acute exanthem. The first outbreak was considered to be a modified form of dengue, later it was thought to be more like measles, under which heading it now appears in almost all reports. The incubation is 5–8 days and the disease appears to be spread by personal contact. Adults are mainly affected and the symptoms differ from true measles. At the onset there is headache and lassitude with conjunctival catarrh and a tendency to haemorrhage into the lower lid, with bronchial catarrh and pyrexia; an eruption of small papules, which may be haemorrhagic, appears on the mucous membrane of the mouth, more especially on the palate. True Koplik spots are not present. Simultaneously or very shortly after, the general eruption of a maculo-papular character comes out, first on the face, then on the trunk and arms, rarely on the legs; the amount of eruption is often very slight and it is followed by desquamation in about one fourth of the cases. Generally the disease runs a mild course, the patient feeling well by the end of the third day, but cough may persist.

The diagnosis has to be made from dengue, rötheln and measles. Dengue has been frequently observed in the New Guinea area and has many similar characters, but the absence of joint pains excludes this.

The course of the disease is more severe than rötheln and less than measles. From the latter it differs in the absence of Koplik's spots, the rarity of the infection of children even when they come in contact with the natives, the shortness of the incubation, and finally in the fact that an attack of measles in childhood does not protect adults from this disease.

[The differentiation from dengue seems incomplete and one of the three charts given, said to be typical, shows a six-day course and the saddle-back character of dengue as found in the orient. Further information is required before this condition can be established as a separate disease, but that it is not measles is fairly certain.]

P. W. B.-S.

Luzzati (A.). **Sulle Malattie Febbrili osservate in Libia alla Base Navale di Tobruck.** [Some Febrile Diseases observed in Libya at the Naval Base of Tobruk.]—*Ann. d. Med. Navale e Colon.* 1914. Feb.-Mar. Anno 20. Vol. 1. No. 2–3. pp. 132-134.

These observations were made at the local military hospital, and concerned a force of 7,000 soldiers and 500 sailors. The following types of fevers were noted:—(1) Irregular continued fevers of an endemo-epidemic form, mostly benign in character, having either a predominance of rheumatic symptoms lasting 3–6 days, or intestinal intoxication signs generally lasting 5–10 days; (2) A dengue type of fever with marked muscular and arthritic pains, lasting about a week, but in some cases followed by a period of marked debility; (3) Typhoid infections. There were about 200 cases, of which 50 were slight. Great advantage is ascribed to the use of anti-typhoid vaccination. Malaria was absent from both the naval and military forces, though in November great numbers of mosquitoes were present—chiefly forms of culex. The sailors suffered very slightly in comparison with the rest of the force.

P. W. B.-S.

Martelli (Pier Nello). **Sopra un Caso di Febbre intermittente simulante Malaria in una Bambina affeta da Cistite.**—*Propaganda Antimalarica.* 1914. Feb. 28. Vol. 7. No. 1. pp. 15-18.

The only interest that this case has from a tropical medicine point of view is the question of diagnosis from true malaria of an intermittent fever associated with inflammatory conditions of the bladder, in infants living in a malarial district. The absence of malarial parasites in the blood, with a probable presence of a polymorphonuclear leucocytosis and the non-curative action of quinine should easily clear up the diagnosis.

P. W. B.-S.

VERRUGA PERUVIANA & OROYA FEVER.

BASSETT-SMITH (P. W.). **Blood Changes in Verruga and Oroya Fever.** —*Trans. Soc. Trop. Med. & Hyg.* 1914. Feb. & Mar. Vol. 7. No. 4. pp. 158-159. With 1 plate.

In the acute form of this disease very marked blood changes are observed, consisting of a great reduction in the number of the red cells with marked poikilocytosis, irregularity in shape and staining, and great numbers of nucleated forms. Reference is made to the peculiar bodies, first described by BARTON, in the red cells in this condition and the recent work by STRONG and his fellow workers is commented upon. This Commission have stated, as their belief, that verruga and Oroya fever are distinct diseases. They have confirmed BARTON'S observations however and believe that his bodies are specific parasites. A plate showing these bodies is given.

G. C. Low.

WERNER (H.). **Ueber Verruga peruviana.**—*Dermatologische Wochenschr.* 1914. Ergänzungsheft zu Band 58 (Festschrift). pp. 144-149. With 1 plate.

This is a rather more detailed account of a case which was described in a previous paper reviewed in this *Bulletin*, Vol. 1, pp. 727–728. An excellent plate is supplied which gives a very real idea of the appearances of the eruption. The condition has to be diagnosed from framboesia, local leishmaniasis and Bassewitz's angiofibroma cutis contagiosum. The latter is associated with fever, is much less severe, and its endemic distribution is different, being found further south than verruga.

P. W. B.-S.

ANDERSON (D. E.). **Verruga Peruana.**—*Trans. xvii Intern. Congress. of Med.* London. 1913. Sect. 21. Trop. Med. & Hyg. Pt. 2. pp. 147-150.

The greater part of this communication consists in a review of work that has been published on verruga, mostly by Peruvian doctors, but it is supplemented by observations made by the author on three cases seen in the hospital at Lima. The eruption was like that of severe small-pox in a late stage, and the papules were tender on pressure. Many of the patients return to their work after the eruption has appeared and hence probably disseminate the disease. The author quotes TOWNSEND'S views on the active part played by a phlebotomus fly in transmitting Oroya fever, but he draws no distinction between the acute fever and the verruga disease, which have since been shown by STRONG and others to be separate affections. The comparisons made between phlebotomus fever of the Mediterranean, Oroya fever and verruga are very involved and do not throw further light on the etiology of the diseases.

P. W. B.-S.

TOWNSEND (C. H. T.). **On the Identity of Verruga and Carrion's Fever.** [Correspondence.]—*Science.* 1914. Jan. 16. pp. 99-100.

The author states categorically his reasons for considering the two conditions as varieties of the same disease. Most of the statements are very controversial and his views are directly opposed to those of STRONG and his fellow workers, who have also studied the conditions. Further details are shortly to be published.

P. W. B.-S.

BOOK REVIEWS.

Fantham (H. B.) [D.Sc.Lond., B.A.Cantab.] & Porter (Annie). [D.Sc. Lond.]. **Some Minute Animal Parasites or Unseen Foes in the Animal World.**—xi+319 pp. With frontispiece and 56 text figs. 1914. London: Methuen & Co., Ltd. [Price 5/- net.]

In the words of its authors " the aim of this book is to give a readable and popular, but accurate, account of the life-histories of some microscopic protozoal organisms that produce disease in higher animals, including man."

The book consists of sixteen chapters, of which thirteen are descriptive, each forming a short treatise by itself, and three deal with generalities.

The mode of treatment is eminently practical and unconventional, and undoubtedly is suggestive and stimulating; classification is subordinated to plot and pitch; the Protozoa that play a tragic part in the human drama are severally shown in their appropriate stages and settings; those that are less notorious are severally introduced as they stand in the grouping of the systematist. Thus are provided excellent dissertations of two kinds—epic and didactic; of the one kind are the chapters on Sleeping Sickness, Spirochaetosis, Malaria, Grouse-disease, Yellow Fever, Redwater and other Piroplasmoses, Kala-azar, and Bee- and Silkworm-diseases; of the other kind are the chapters on Amoebae, Ciliate Infusoria, Myxosporidia, and Sarcosporidia.

Of course, something has to be taken for granted or, at least, anticipated, in the due performing of the dramatic method; as where the spirochaetes are given substantive rank in the Animal Kingdom, and the unknown virus of yellow fever is dealt with in the body of the book, instead of in an appendix. Occasionally also the professed accuracy of the authors' aim has to be sacrificed to effect; as where the tsetse-fly is represented as " dropping maggots which rapidly become very like the foetid surroundings in which they live." The unrestrained dramatic method also leads sometimes to a certain amount of overstatement, which is profitable neither to the innocent reader nor to the good cause which it is meant to support; as where the spread of Glossina from Africa to India in " certain kinds of vegetable cargo " is alluded to seriously as a practical danger; or where the development of Southern India (of all places on this dull terrestrial ball) is represented as having been retarded by the destructive effects of Protozoa upon transport animals; or where the airy vision that sees Protozoa at the bottom of all the extinction revealed by the geological record is mentioned with respect and half approval.

But outside such concessions to the sick appetite of a sensation-loving age, the book, with its clear illustrations, well fulfils its programme.

A. Alcock.

Schilling (Claus) [Professor Dr.]. **Immunität bei Protozoeninfektionen.** [Immunity in Protozoal Diseases.]—In Kolle & Wassermann's *Handbuch der pathogenen Mikroorganismen.* 2nd edit. 1913. Vol. 7. pp. 565-606. With 1 text fig. [Verlag von Gustav Fischer in Jena.]

This monograph represents a most extensive survey of the whole field of immunity in protozoal diseases. The author has collected a great mass of clinical and experimental observations and has welded them into a homogeneous whole, thus presenting to the reader a clear conception of the extremely difficult problems which beset research in this domain. After reading this valuable article one's chief regret is that a large number of the publications cited in the text do not appear in the list of references.

At the outset Schilling draws attention to the fact that the investigation of immunity phenomena in protozoal diseases is hampered by a number of circumstances: thus (1) certain protozoa pathogenic to the human subject do not cause infections when inoculated into animals; (2) in the study of other organisms one is practically restricted to the investigation of the infection in animals which are not affected by the disease under natural conditions and frequently, in order to preserve the parasites, it is necessary to propagate them through a series of animals; such passages produce marked alterations in the biological characters of the protozoa; (3) only a proportion of the organisms can be grown on artificial culture media; (4) the natural mode of propagation of the infection frequently cannot be imitated in the laboratory, e.g. in the case of transmission by biting flies which live only in the tropics.

Fairly full knowledge regarding the immunity in protozoal diseases is practically restricted to that group of organisms which cause blood infections. Immunity phenomena may be grouped according as they occur (*a*) in an unmodified attack of the disease; (*b*) after treatment of the infection by means of chemotherapeutic agents; (*c*) as the result of vaccination with dead or attenuated organisms.

Immunity in the course of unmodified infections.

A characteristic feature of protozoal diseases, whether experimentally produced or occurring under natural conditions, is the incubation period. During this stage, in spite of progressive multiplication of the organisms, no prodromal symptoms occur, and the infected subject may be in perfect health. The attack may then set in and reach its height with extreme suddenness. The question as to the cause of the severe pathogenic effects which occur in many protozoal diseases is difficult to answer; in the case of certain trypanosome and spirosome* infections, in which the parasites multiply rapidly, and are present in great numbers in the blood, a plausible explanation was that the host suffered deprivation of essential nutritive materials. This is not the true reason, however, since in dogs or horses infected with nagana trypanosomes the parasites, after being extremely abundant in the blood, may disappear, and the animals recover. [Where drug treatment leads to a chronic trypanosome infection in mice, the parasites may at some periods appear to be more abundant in the blood than they are at the time of death in untreated animals inoculated with the virulent strain.]

The substances which give rise to toxic effects are designated "paroxysmal toxins" by Schilling. He considers that the amount of such substances present in the body at a given time must exceed a certain minimum before any ill effects follow. These toxins practically do not act as antigens as is shown by the fact that, in untreated cases of malaria, paroxysms may occur with undiminished intensity for a period of weeks. [Certain bacterial toxins also fail to produce immunity; thus rabbits do not become immune to injections of the haemolysin produced by streptococci.] In how far the toxic phenomena may be of anaphylactic nature has not yet been determined. The existence of toxic substances in the bodies of the parasites has not been demonstrated with certainty. [Uhlenhuth and Seyderhelm have recently found that suspensions of trypanosomes killed by means of a weak electric current are very toxic for mice.]

In certain protozoal diseases the first attack may terminate in death; this occurs only rarely in the human subject, e.g. sometimes in relapsing fever, but it is the rule in small animals inoculated with large numbers of highly virulent parasites. On the other hand, certain infections, like syphilis, are characterised by their extreme chronicity. In many forms of protozoal infection, if survival occurs, the attack ends abruptly by crisis, the parasites disappearing suddenly from the blood, as in relapsing fever and fowl spirosomosis. Accompanying the crisis parasiticidal antibodies have been found to appear in the blood. In rats infected with the parasites

* Schilling applies the term "spirosome" to the pathogenic spirochaetes in general with the exception of *Treponema pallidum*; similarly "pirosome" represents any member of the piroplasma group.

of Russian relapsing fever, the antibodies can be demonstrated in the serum as soon as the spirosomes begin to diminish in the blood ; thus the immune substances appear critically within a few hours. As GRABITSCHEWSKY first of all showed, the serum during convalescence from relapsing fever exerts a parasiticidal action *in vitro*. This observer found in the case of an infected monkey that the serum did not possess a powerful parasiticidal action until thirty-six hours after the crisis ; four days after the crisis the serum was again practically inactive although the animal remained completely immune to reinoculation. [Such results raise a doubt as to whether the crisis and the consequent immunity to reinfection are due to precisely the same factors as those which operate in conferring passive immunity, or which produce parasiticidal action *in vitro*.] Whether phagocytes, especially the mononuclear cells, play any important part in the process of recovery from the attack is still a debated question. The termination of the attack is by lysis, not by crisis, in the majority of protozoal infections. The presence of parasiticidal antibodies in the serum of infected animals is a common occurrence in the course of many protozoal diseases, e.g. relapsing fever, trypanosomiasis, canine pirosomosis ; on the other hand, it has been impossible to demonstrate such antisubstances in malaria and cattle pirosomosis. The antisera exert a protective effect, so that a normal animal when inoculated with a mixture of parasites and antiserum does not become infected ; powerful antisera also confer passive immunity, and may even possess curative action. Parasiticidal antibodies can be developed by injections of killed organisms ; thus dead trypanosomes may possess antigenic properties.

The identification of trypanosome species by means of parasiticidal immunity.—LAVERAN assumed that if an animal which had recoverd from a trypanosome infection was inoculated with a second strain of trypanosomes and did not again become infected, then the conclusion was justified that the two strains of parasites belong to the same species ; on the other hand, if infection occurred as the result of the second inoculation, then the two strains belong to different species. Schilling points out that this method of " cross inoculation " as practised by LAVERAN, is not perfectly valid, since in a number of instances the inoculations were carried out with strains of parasites, which had been propagated through other animals, a procedure which is known to lead to profound changes in the biological characters of the trypanosomes. In order to obtain conclusive results, Schilling suggests that all the inoculations should be effected by the bites of insects, which act as the natural transmitters of the infections under consideration.

A number of *immunity reactions* are found to occur with the blood serum of infected animals, viz. (*a*) precipitation of extracts of the parasites (trypanosomes) ; (*b*) agglomeration of trypanosomes—the addition of certain normal sera aids this reaction, e.g. that of the horse, pig, etc. ; on the other hand human serum and the sera of some animals are inactive ; (*c*) " attachement " appears to be related to agglomeration ; when blood containing trypanosomes is mixed with leucocytes from an infected animal, the parasites become attached to the white cells—the phenomenon occurs with either dead or living leucocytes ; (*d*) trypanolysis ; (*e*) opsonins, which are thermostable ; (*f*) complement deviating antibodies are found in the serum of animals infected with trypanosomes ; thus a mixture of the infected animal's serum, along with an emulsion of trypanosomes, has the property of fixing haemolytic complement. Similarly the injection into healthy animals of dead trypanosomes gives rise to complement-deviating antisubstances. Such antibodies developed in the serum of infected or immunised animals are specific for the trypanosome antigens, and must be clearly distinguished from the property of giving rise to complement-deviation which the serum may exhibit when mixed with emulsions of certain lipoid constituents present in normal tissues. The latter phenomenon, first observed in the case of syphilis (WASSERMANN, NEISSER and BRUCK), and since then recorded in other protozoal infections, is not an immunity reaction in the true sense of the term, as the reacting bodies in the serum do not operate along with constituents of the parasites. [Statements regarding the development of the property of giving a positive Wassermann reaction in the serum of animals, e.g. rabbits, infected with

protozoa must be accepted with caution, since it has been shown that many apparently normal animals may possess this character.]

These various antibodies are developed independently in the blood, and a serum which manifests one reaction in a marked degree may be devoid of the power of causing others; thus there is no necessary correspondence between the agglomerating and the protective action of the serum in trypanosome infections. It has been shown in the case of trypanosome infections that the antibodies are in general specific for the genus trypanosome, but frequently not for the particular species in response to which they have been developed. Accordingly, these reactions are of no constant value for the identification of species. There does not appear, however, to have been any considerable attempt made to separate principal reactions from group reactions by quantitative experiments. According to KOLLE and SCHATILOFF serum from cases of relapsing fever after the second febrile attack gives a complement deviation reaction which is of value for diagnosis, and also for differentiation of the type of spirosome causing the infection.

Autoagglutination. The serum, in cases of trypanosome and spirosome infections, has been found in many instances to possess an agglutinin for the individual's own red blood corpuscles (autoagglutinin). This phenomenon occurs most markedly at low temperatures—approaching 0° C. (YORKE). It may prove of considerable value for diagnosing the presence of infection with protozoal organisms.

Human serum in animal experiment has a marked protective action against infection with the trypanosomes of nagana and against *T. evansi*, *equinum* and *dimorphon*, and when the serum is injected into an infected animal the parasites undergo solution in the blood. This property resides in the globulin and is comparatively thermostable. No parasiticidal effect occurs *in vitro*, and the serum is said not to possess opsonic action. Against *T. gambiense*, human serum is without action and this fact will enable the parasite to be identified, e.g. when it occurs in animals which act as "reservoirs."

If recovery from the primary attack occurs, the further course of the infection varies, being dependent principally on the nature of the infecting agent. Thus complete sterilisation and immunity is the rule in South African East Coast fever of cattle, and in certain varieties of fowl spirosomosis; in the former disease the immunity usually persists throughout life. In relapsing fever, cure accompanied by a certain degree of immunity occurs eventually after a series of relapses. On the other hand in malaria spontaneous cure, along with the acquisition of active immunity, takes place only in a proportion of cases; as a rule the infection persists in a more or less latent state, and the infected individual on furthur inoculation does not suffer from further symptoms of the disease; in fact such "superinfections," when occurring at sufficiently frequent intervals, have the effect of maintaining and intensifying insusceptibility.*

The immunity to malaria possessed by native peoples is to be ascribed to such latent infection; the primary inoculation probably occurs at an early age—KOCH observed that as adult life was reached, the parasites were found with diminishing frequency in the blood—and insusceptibility is established by superinfections. Infection with tertian malaria, however, does not protect against the quartan type. It is obvious that the cases of latent infection act as a continual source of parasites, and are therefore a danger to the unprotected portion of the community.

To preserve the state of insusceptibility it is essential that superinfections should be repeated at short intervals, as happens in districts where the malarial season lasts throughout the year; in districts where malaria has merely a seasonal incidence the superinfections are interrupted for sufficiently long to prevent the maintenance of immunity. This explanation, however, may not be adequate to explain all the facts. In a number of other protozoal diseases also, cure in the sense of complete killing off of the parasites does not occur spontaneously; this is the case in pirosome

*The variety of mosquito which transmits the infection no doubt plays a part in determining the immunity, since it may affect the state of development of the parasites and their virulence.

infections in general and in trypanosomiasis and frequently also in syphilis. In these conditions such immunity as develops is of the non-sterilising type (EHRLICH) or, as Schilling terms it, labile infection. The development of this state is due to mutual adaptation of the host and the parasite; the host develops antibodies to the protozoa, and at the same time the parasites accommodate themselves to the new conditions which arise when the antisubstances are produced. A variety of circumstances conduces to this result; thus the parasites are not all equally susceptible to the action of the serum-antibodies and, further, a proportion of the organisms are protected from the full effect of the antibodies by anatomical conditions, e.g. when they are lodged in the capillaries in certain tissues such as the bone marrow and lymph glands. The consequence is that a number of the parasites adapt themselves and a balance is established between the pathogenic activity of the organisms and the antagonistic mechanism of the host. Canine piroplasmosis affords a characteristic example of this condition; the blood of a recovered animal remains permanently infective for susceptible dogs and the virulence of the parasites may even undergo no diminution. At the same time the host is immune to superinfection; in fact, as the result of repeated inoculations of such a "salted" animal with infective blood, its serum acquires a powerful protective action against virulent organisms which are not accommodated to the antibodies. The equilibrium which subsists between the host and the parasites is, however, liable to be upset at any time when the general vitality of the host is lowered; this is strikingly shown in cattle which have recovered from Texas fever, in whom over-exertion brings on a fresh attack of haemoglobinuria. In cases of diseases belonging to this group the rule probably holds good in general, that immunity to reinoculation exists only so long as there is a latent infection with living parasites present in the body; whenever cure has been effected, the individual again becomes susceptible to a fresh inoculation and responds with the characteristic symptoms of the disease.

The genesis of relapses. As has been mentioned in the case of labile infections, when the equilibrium between host and parasites is upset, fresh symptoms of disease appear; this is well-known in malaria. But in trypanosomiasis, malaria, syphilis, and especially in relapsing fever, recurrences take place apparently without any cause. The explanation is that those parasites which have survived the action of the antibodies elaborated at the time of the primary attack, themselves develop an immunity to these antibodies and thus become serum-resistant. Such a condition probably represents an extreme degree of the process of accommodation which leads to latent infection. When serum-resistant parasites divide the resulting individuals also are resistant, and the resistance persists when the organisms are transferred to another animal and proliferate similarly in its body. The following experiment illustrates these points—Two rats, A and B, are inoculated with the spirosomes of relapsing fever (it is to be noted that the strain of parasites employed is propagated by successive passages through animals, the subinoculations always being made during the primary attack); after the primary attack in the rats has ended by crisis, A is bled and its serum preserved, B is allowed to live until a relapse occurs, then it is bled at a time when parasites are present in the blood. The infective blood of B is added to the serum of A and a mouse is inoculated with the mixture, the result is that infection occurs. At the same time a second mouse is inoculated with a similar mixture of the serum of A, along with infective blood, but the parasites in this instance belong to the original (unrelapsed) strain; this animal remains uninfected. It is obvious, therefore, that the parasites of the relapse-strain are insusceptible to the antibodies which have developed as a result of the primary attack and which are active towards parasites of the original strain. We owe especially to EHRLICH and his collaborators the analysis of this most important phenomenon. EHRLICH concludes that the parasites possess an apparatus of *nutriceptors* which enables them to take up nutritive materials. When the parasites are killed in the body of an infected animal, these nutriceptors act as antigens and cause the development of corresponding antibodies. These antibodies act by plugging the nutriceptors, so that the parasites are rendered incapable of assimilating food stuffs, and in consequence die of starvation; accordingly, the possession of antibodies

of this kind confers on an animal a true athreptic immunity. If parasites, which possess nutriceptors of type A, are subjected to the action of the corresponding antibodies in a degree insufficient to cause their death then, the nutriceptors being plugged and hence useless for purposes of nutrition, the parasites develop a fresh type of nutriceptor (B). This process may occur with great rapidity ; thus EHRLICH, ROEHL and GULBRANSEN found that if trypanosomes were exposed to serum antibodies *in vitro* for a short time (¼-hour) they became serum-resistant as tested in animal experiment. In relapsing fever the parasites which develop at each relapse possess a fresh type of nutriceptor. Presumably a period is reached at which the power of the organisms to develop fresh types of nutriceptor is exhausted and then the infection dies out. But trypanosomes, *Treponema pallidum* and *Plasmodium malariae* can apparently produce an almost endless variety of nutriceptors, hence there is the possibility of an unlimited number of relapses. When parasites possess simultaneously several different types of nutriceptors, then in order to protect against infection by means of an antiserum it is necessary that antibodies to every type of nutriceptor possessed by the organism shall be present in the serum. When once a particular type of nutriceptor has been developed, the succeeding generations of parasites which arise by asexual division reproduce this acquired character ; this holds good even if the parasites are transferred through a series of individuals. EHRLICH found that the species of the host affected the capacity of the parasites to develop fresh nutriceptors ; in the mouse trypanosomes can develop a great variety of relapse strains, whereas in the rabbit their power is limited.

Immunity after treatment with chemotherapeutic agents.

The destruction of parasites within the body of an infected animal through the agency of a chemical compound leads to immunity and the development of antibodies in the serum. This subject has been extensively investigated in the case of experimental trypanosome infections. The antibodies are stated to appear in the serum with remarkable rapidity ; thus in rabbits infected with nagana antibodies are said to have been found three hours after an injection of arsenophenylglycin. It is supposed, therefore, that the antibodies exist preformed in the tissue cells and are set free in some way by the drug. It has been found that when mice infected with suitable strains of trypanosomes are cured by drugs and are then reinoculated repeatedly at short intervals, a considerable degree of immunity can be produced (TERRY). So far, the practical application of this method is restricted since in few instances is it possible to cure man and larger animals by any known therapeutic agents.

Immunity following the injection of killed parasites.

Many attempts to immunise animals by employing killed trypanosomes have proved futile ; TEICHMANN and BRAUN, however, have succeeded by means of parasites separated by the centrifuge and then dried and treated with toluol ; Schilling also produced immunity by injecting parasites killed by means of tartar emetic. Only certain strains of trypanosomes, however, possess the immunising property in a marked degree. The immunity which results is not definitely specific for the particular species of trypanosome injected, since treatment with nagana trypanosomes protected against infection with dourine and mal de caderas, although not against *T. gambiense*. On the other hand, as might be expected, immunisation with a serum-resistant strain did not protect against infection with the original strain ; similarly, injections of the original strain did not confer immunity towards the serum-resistant parasites. *In vitro* however, an antiserum to the one strain led to deviation of complement along with parasites of the other strain. Schilling concludes from these results that the action of an antiserum in animal experiment is essentially different from its effect in the Bordet-Gengou reaction, and that the antibody which causes complement-deviation in the test tube is distinct from that which, by its action on the parasites in the body of the infected animal, causes the development of serum-resistance. Should protective immunisation by means of killed parasites ever prove to be of practical value, the important question would arise as to whether serum-resistant strains are transmitted by insects under natural conditions. There are no experimental data available which bear directly on this point ; but it is possible

that during the sexual cycle in the fly serum-resistance is lost, just as Gonder has demonstrated that a drug-resistant strain of *T. lewisi* ceased to be resistant after passage through the rat-louse (*Haematopinus spinulosus*) which is a natural transmitter of this trypanosomes, and in which it undergoes sexual development. On the other hand, drug-resistant strains of *Sp. gallinarum* and *recurrentis* when passed through ticks (*Argas persicus* and *Ornithodorus moubata* respectively) were found to retain their resistance, thus suggesting that the spirosomes, unlike trypanosome, do not undergo a 'sexual' cycle in the invertebrate host. [The part played by antibodies in bringing about cure in some protozoal infections was well shown in experiments in which Gonder infected fowls with a mixture of a salvarsan-resistant strain of *Sp. gallinarum* and a non-resistant strain. On treatment with salvarsan the result was complete cure, the drug-resistant parasites being killed off by the antibodies developed as a result of the destruction of the susceptible organisms by the drug.]

In the special section of his monograph, Schilling details the methods of developing immunity which have been practised in the various protozoal infections. The problem of elaborating procedures of practical value requires for the most part to be solved by future investigation.

C. H. Browning.

Calmette (A.) & Bruyant (L.). **Intoxikationskrankheiten. 2. Vergiftungen durch tierische Gifte.** [Intoxication Diseases. 2. Animal Poisons.]—Mense *Handbuch der Tropenkrankheiten.* 2nd Edit. Vol. 2. pp. 617-678. 1914. Leipzig: Verlag von J. A. Barth. [Mk.40; or Mk.42 cloth bound.]

As part of a practical Handbook of Tropical Diseases this particular treatise on infection by animal toxins is not at all easy to appraise. In so far as it includes an account, by an original master like Calmette, of the properties of the most important of these toxins, and of the theory of immunisation, it is not only authoritative in the highest degree, but is also important and interesting in other ways. But in so far as it does not include—though the matter is within its admitted purport—an adequate account, sufficient at least to facilitate recognition, of the animals that secrete the venoms, it appertains rather to the academy than to the forum, rather to the physiological laboratory than to the broad fields of practice, and furnishes an illustration of the argument that injuries due to the direct attacks of animals above the grade of Protozoa are more rationally discussed as a branch of applied zoology than in any other connection.

This deficiency is manifest even in the article on the venomous snakes, which forms the chief component of the treatise. Here we have indeed a clear and methodical account, in convenient compass, of snake venom—of its physical and chemical properties, of its physiological and pathological action on the blood and tissues, of the natural immunity exhibited to a certain extent by some animals, and of the artificial acquisition of immunity; and an equally satisfactory account of the antitoxic properties of the serum of the animals artificially immunised, and of the general principles of treatment by such antidotal sera—the specificity of the several sera, and the practical necessity of a multivalent serum for special countries being fully recognised. But when we turn to the sections on the structure, classification and geographical distribution of venomous snakes the masterly touch has vanished, and we become aware of extraordinary omissions, and also see loose statements that might perhaps be attributed to misapprehensions in translation, as well as signs of carelessness for which a translator can hardly be responsible entirely.

To mention but a few of the most obvious of the omissions only: The aggressive and dangerous *Echis carinatus*, which is one of the commonest venomous species of the drier tracts of South-western Asia, from Arabia and Persia to Cape Comorin, and is also as common in certain West African localities as it is in North-Eastern Africa, is here attributed merely to that limited part of its very wide range which happens to coincide with Egypt.

The big cobras of Tropical Africa are not mentioned, nor the deadly and aggressive *Dendraspis*, nor the aberrant—but extremely common—African viperids *Causus* and *Atractaspis*.

The rest of the treatise is composed of short articles, with separate bibliographies for each, on stinging Zoophytes, Sea-urchins, Mollusca, Spiders, Scorpions, Centipedes, Hymenoptera, and Fishes, and on the venomous secretions of Toads and Salamanders, Lizards, and the Duck-mole (*Ornithorhynchus*).

Among the Fishes the Sting-rays (*Trygonidae*) are not noticed—a most surprising omission, since of all the fishes that can inflict envenomed wounds, the Sting-rays are at once the largest and the most formidable, and in tropical seas and estuaries are by far the commonest and most widely distributed. All round the Indian coasts, for instance, the only fishes that are held in universal dread by fishermen, and that when captured are at once deprived of their terrible barbed poison-spine, are the Trygons and their kind.

Among the Mollusca that can inflict a venomous bite the Cones and Augers (*Terebridae*) are not mentioned—the bite of certain Cones being notorious ; and by an oversight the bibliography of the venomous Mollusca is appended to the article on Worms.

A. A.

Baermann (Gustav) & Eckersdorff (Otto). **Atlas tropischer Darmkrankheiten.** [Atlas of Tropical Intestinal Diseases.]—viii + 56 pp. With 57 plates. 1913. Leipzig: Johann Ambrosius Barth. [Mk.80.]

The Atlas contains 57 plates, 43 of these being in colour, and the rest (14) photographs. Each has an explanatory text which describes the appearances seen and the pathological conditions found. The authors obtained their material from the Central Hospital of Petoemboekan in Sumatra and are indebted to Mr. Fritz Skell for the illustrations, the latter after having accompanied Baermann to Sumatra staying there for a year and illustrating the work.

Of the diseases dealt with amoebic and bacillary dysentery, of course, come first, the appearances of these in acute and chronic forms being very well depicted. Examples are also given of mercurial enteritis and membranous colitis. Then come typhoid and cholera, haemorrhagic enterocolitis due to streptococcus, septic croupous enterocolitis and septic ulcerative colitis. Next syphilitic diseases of the bowel are dealt with, then tubercular affections, and finally the conditions produced by ankylostomiasis infection.

The text is well written and accurate and shows that the authors have a sound knowledge of pathology. The coloured plates are certainly the best that have so far been produced on tropical conditions. The Atlas should prove of great value for teaching purposes and tropical schools would do well to have a copy of it. The authors are to be congratulated on their valuable work, which must have involved great labour to carry it out successfully. For much of this, of course, the honour goes to Mr. Skell. The standard of his work is high and his coloured plates are really excellent.

G. C. Low.

Manson (Sir Patrick) [G.C.M.G., M.D., LL.D.]. **Tropical Diseases. A Manual of the Diseases of Warm Climates.**—Fifth Edition. xxiv + 937 pp. With 12 colour and 4 black & white plates and 239 text figs. 1914. London: Cassell & Co., Ltd. [Price 12/6 net.]

The fifth edition of "Tropical Diseases," Sir Patrick Manson's well-known work, has just been published. This has been revised throughout and enlarged, the number of pages, with the index, extending now to 937 in

place of 876 in the fourth edition. In addition to this increase in size, some extra coloured plates have been added besides four black and white plates, and many additional figures in the text. As regards the different subjects treated, Kala Azar and Oriental Sore now come under the heading of Leishmaniasis and two new subjects viz., Phlebotomous Fever and Rat-bite Disease are included. The appendix has been changed, SAMBON'S classification of the protozoa giving way to a more simple one by BAHR, to whom the author acknowledges his indebtedness for assistance rendered in the preparation of this edition. A good part of the text is much as it was in the fourth edition, but work which has been published since then is incorporated where necessary. This makes the reading somewhat difficult in parts, but such a result could hardly be avoided unless the whole work were re-written. This might be advantageous in a future edition. So rapidly does our knowledge of Tropical Medicine advance that a new edition when it appears is already out of date. None of the new work published, for example, on the transmission of *Dermatobia cyaniventris* by means of mosquitoes (*Janthinosoma*) [See this *Bulletin* Vol. 2, pp. 527-529 and Vol. 3, p. 274] is included. This forms one of the most interesting studies on adaptation which has recently appeared.

There are one or two misstatements which might be rectified. The old mistake of *Stegomyia fasciata* as a proper intermediate host for *Filaria bancrofti* is perpetuated though the error is mitigated by the words "probably occasionally" after it. Also on page 323, the author, speaking of plague in California, states that the flea, *Hoplopsyllus anomalus*, which infests squirrels and rats, acts as the carrier of the bacillus from one to the other. This is not strictly correct, the species being really *Ceratophyllus acutus*. Amongst other things one notices the separation of Blackwater Fever from Malaria and the inclusion of Siriasis as a special entity. Points however, such as these, in the re-writing of the work would probably be more critically dealt with. Some of the diagrams might also be improved, the small sketches of trypanosomes in the appendix, pages 902, 903 and 905, being of little use and filling up space. The coloured plate of the tsetse flies *palpalis* and *morsitans* seems to have suffered somewhat in reproduction, the contrast between the dark abdomen of *palpalis* and the much lighter abdomen of *morsitans* being scarcely shown. In nature these species are easily distinguished by their colour.

These are some points which are worthy of mention, but one thoroughly appreciates the difficulties of having everything perfect in a work covering so much ground and realizes that they are but small blemishes in what is a very valuable book. Being the pioneer work on recent Tropical Medicine one always looks forward with pleasure to reading each new edition as it comes out and one hopes that such a long space of time will not elapse between the fifth and sixth editions as has done between the fourth and fifth.

G. C. L.

By Royal Warrant to H.M. the King.

IZAL

A TRIUMPH OF CONCENTRATION.

The pioneer modern high-power germicide. Officially adopted throughout the British Empire. Uniform germicidal power guaranteed. Mixes equally well with soft, hard and brackish, or salt water.

MEDICAL IZAL

Specially prepared for Medical and Surgical work. Used with marked success as an intestinal antiseptic in the treatment of Dysentery, Enteric Fever, Cholera, etc.

IZO-IZAL

A combined germicide and pesticide. Unrivalled for the destruction of insects and larvae, and microbes, at one operation. 1 part in 30,000 destroys mosquito larvae.

AGENCIES THROUGHOUT THE EMPIRE.

Samples and Scientific Reports sent free on application to the Manufacturers:

Newton, Chambers & Co., LTD.,

THORNCLIFFE, near SHEFFIELD.

BUREAU NOTICES.

Works in the Bureau Library may be consulted between 10 and 5.30.

The Director can be seen between 10 and 1; for a later hour an appointment should be made.

The Director will be glad to receive early copies of works or reprints on Tropical Diseases for notice in the *Bulletin* and for the Library. To be addressed—Tropical Diseases Bureau, Imperial Institute, London, S.W.

(Telephone:—Kensington, 5188.)

BOOKS RECEIVED.

TIBBLES (William). [LL.D., M.D. (Hon. Causâ) Chicago; L.R.C.P. Edin.; M.R.C.S.Eng.; L.S.A.London]. Dietetics or Food in Health and Disease.—x + 627 pp. Demy 8vo. 1914. London: Baillière, Tindall & Cox, 8, Henrietta Street, Covent Garden, W.C. [Price 12s. 6d. net].

MANSON (Sir Patrick) [G.C.M., M.D., LL.D.(Aberd.)] Tropical Diseases. A Manual of the Diseases of Warm Climates—Fifth Edition, Revised throughout and Enlarged. xxiv + 937 pp. Crown 8vo. With 12 coloured and 4 black & white plates and 239 figures in text. 1914. London: Cassell & Co., Ltd. [Price 12s. 6d. net].

ALLESSANDRINI (Guilo) & SCALA (Alberto): Contributo nuova alla Etiologia e Patogenesi della Pellagra.—176 pp. Royal 8vo. With 8 coloured plates and 30 text figs. 1914. Rome: Tipografia nazionale di G. Bertero E.C. Via Umbria. [Price not stated].

LUDLOW (C. S.). Disease-Bearing Mosquitoes of North and Central America, the West Indies and Philippine Islands.—*U.S. Army War Department, Office of the Surgeon-General.—Bulletin No. 4.* 1913. Nov. 96 pp. With 27 plates & 29 figs.

The Annual Subscription for the Tropical Diseases Bulletin is TWENTY-ONE SHILLINGS post free.

Subscriptions should be sent to Messrs. BAILLIÈRE, TINDALL and COX, 8, Henrietta Street, Covent Garden, London, W.C., who are also the advertisement agents.

The Bulletin appears, as a rule, twice a month.

Cloth cases for binding the Bulletin can be obtained from Messrs. BAILLIÈRE, TINDALL and COX, price One Shilling and Sixpence post free.

The Tropical Diseases Bureau publishes also the TROPICAL VETERINARY BULLETIN, quarterly, Annual Subscription Ten Shillings, single numbers Three Shillings post free; to be obtained from the above agents.

CONTENTS.

UNDULANT FEVER.

PAGE.

PATERSON & BROWN: Undulant Fever in the Indian Army (map) 1
DELLA VIDA: Undulant Fever near Rome 3
GATTO: Undulant and Three-Day Fever in Calabria 3
CANTANI: Phlebitis in Undulant Fever 3
CARNEIRO: Undulant Fever in Brazil 4
BASSETT-SMITH: Recent Research Relating to Undulant Fever 4
CANTANI: The Value of the Agglutination Reaction in Diagnosis 6
BASSETT-SMITH: The Agglutination of *M. melitensis* by Normal Cows' Blood 7

SPRUE.

BAHR: Researches on Sprue 8
JUSTI: The Causation of Sprue 10
LOW: Arthritis and Sprue 11
SCHMITTER: Sprue Treated by Emetine 12
WERNER: Scurvy in a Case of Sprue 12

PLAGUE.

LOW: Progress and Diffusion of Plague in 1911 and 1912 .. 13
BROWNING-SMITH; TURKHUD; KUNHARDT: Annual Reappearance of Plague in India with Reference to Importation .. 13-15
TAYLOR: Plague in the Madras Presidency 16
WHITE: Plague in India in Relation to Grain 17
CASTELLANI & PHILIP: Plague in Ceylon 18
FARGIER; ARNOULD: Plague in French Indo-China 18-19
DOUCET; LEBOEUF; COLLIN; BÉROS & BOCQUILLON: Plague in New Caledonia 19-20
GRUBBS: Plague in Porto Rico 20
ILVENTO & MAZZITELLI: *B. pestis* in the Organism without Clinical Symptoms 21
ROW: Curative Value of Glycerinated Pest Vaccine 21
STEVENSON: Absence of Negative Phase after Inoculation with Plague Prophylactic 22
SCHÖBL: Bacteriological Observations made in Manila .. 23
KATO: Transmission of Plague by Fleas 23
LISTON; ROSS; DE RAADT; BROWNING-SMITH: Plague Preventive Measures 24-25
SWELLENGREBEL & OTTEN: Sub-Acute Plague in Rats and Guinea-pigs 26
MARKL: The Recovery of *B. pestis* from Dead Rats 26
DE BEAUFORT; DE RAADT: Rats in Java. (Figure) 27
STRICKLAND: The Biology of *C. fasciatus* 29
ROSS: The Fleas of *Mus rattus* in Northern India 29

TROPICAL SKIN DISEASES.

CHALMERS & O'FARRELL; CHALMERS & STIRLING; JOHNS: Trichonocardiasis 30-31
PRIESTLEY: A new Ringworm from Queensland 31
JOYEUX: A new Ringworm from the French Sudan 32
MONTGOMERY & CULVER; CULPEPPER: Dhobie's Itch .. 32-33
CASTELLANI: Tinea Imbricata 33
VASCONCELLOS: A new Ringworm from Brazil.. 34
PINOY: Treatment of Mycetoma.. 34
BRAULT: Enantiothamnosis 35
HORNSEY; CHAZARAIN-WETZEL: Dermatitis Venenata .. 35-36
BLANCHARD; Le DANTEC; BERNARD; HEYMANN: Tropical Phagedenic Ulcer 36-38
WHYTE: A Form of Ulcar met with in China 38
CORLEIS: Creeping Disease in the Ural District 39
GOUGEROT & VOILLEMOT: Craw-Craw 39
ARGAUD & BRAULT: Ainhum 39
CHALMERS & CHRISTOPHERSON: Murmekiasmosis Amphilaphes 40
BARLOW: Impetigo Tropica 40
LOISELET: A Case of Acanthosis Nigricans 41
CHALMERS & BYAM: Vaccine Lichen in Sudanese Natives .. 41
ANDERSON: Uta 42
BENJAMINS: Gangosa 42
STANNUS: Anomalies of Pigmentation in Nyasaland Natives 43
de NAPOLI: Skin Diseases in Tripoli 44

PAPPATACI FEVER, DENGUE, UNCLASSED FEVERS.

PEIPER; CLARK; SPAGNOLIO: Pappataci Fever 45
ROUBAUD: Reptiles as Hosts for Phlebotomus 46
KING: The Breeding Places of Phlebotomus 46
BIRT: Pappataci Fever and Dengue 47
TIMPANO: Seven Day Fever in Calabria 47
MITCHELL: Seven Day Fever of Indian Ports 47
GOUZIEN: Unclassed Fever in Annam Harbours 48
WICK: Unclassed Fever in New Pomerania 48
LUZZATI: Febrile Diseases observed in Libya 49
MARTELLI: Cystitis and Malaria in Children 49

VERRUGA PERUVIANA AND OROYA FEVER.

BASSETT-SMITH; WERNER; ANDERSON; TOWNSEND 50-51

BOOK REVIEWS.

FANTHAM & PORTER: Some Minute Animal Parasites or Unseen Foes in the Animal World 52
SCHILLING: Immunität bei Protozoeninfektionen [KOLLE & WASSERMANN'S Handbuch] 52
CALMETTE & BRUYANT: Intoxikationskrankheiten. 2. Vergiftungen durch tierische Gifte [MENSE'S Handbuch] .. 58
BAERMANN & ECKERSDORFF: Atlas tropischer Darmkrankheiten 59
MANSON: Tropical Diseases. A Manual of the Diseases of Warm Climates.. 59